THE IRON TRADE REVIEW

VOLUME XXVIII. CLEVELAND, O. OCTOBER 3, 1895 CHICAGO, ILL. NUMBER 40.

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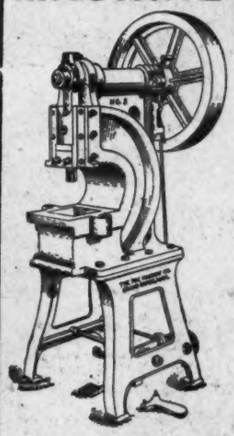

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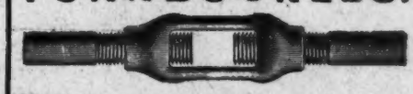

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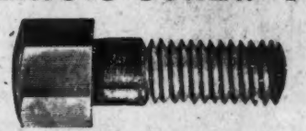

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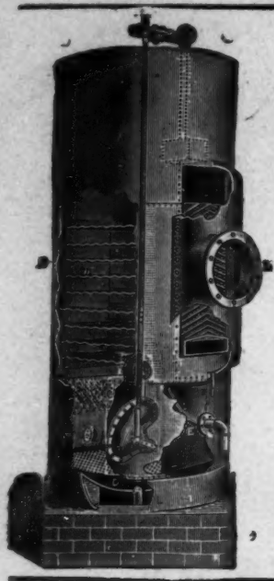

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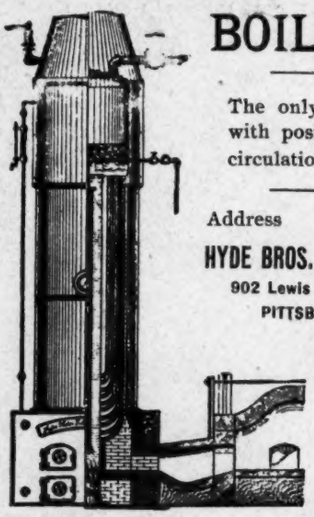

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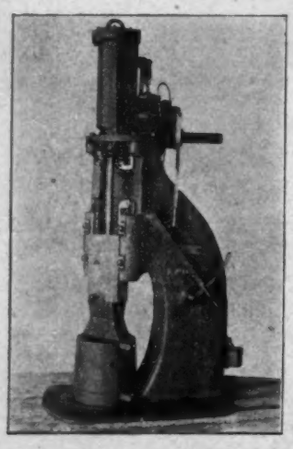

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THE IRON TRADE REVIEW

VOLUME XXVIII. CLEVELAND, O. OCTOBER 3, 1895. CHICAGO, ILL. NUMBER 40.

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The question of immediate moment to the iron trade is to what extent surface indications are a real index of the course of the market in the next few weeks. Reports from all quarters concur in the statement that buying is lighter, but there is unanimity also in the view that an undertone of strength is present with the waiting. That the advance in rails has not decided the railroads on a course of waiting is evidenced by a 40,000 ton order from the Pennsylvania Road at the new price, while indications appear of further requisitions by other lines, for 1895 delivery, the $28 basis at Eastern mill being limited to shipments before Jan. 1. It is the size of demand which has not yet appeared, but which there are reasons to believe will soon materialize, that puzzles the prophets. In Bessemer pig iron, for example, there have been signs the present week that the sequel of the recent successful effort to break the market, through the sale at low prices of iron bought for Western delivery, is at hand. Inquiries have been made for prices on considerable lots for the Chicago district and if these result in sales it is believed all the speculative iron from which recent sales have been made will be taken out of the way. In the week a few lots of Bessemer iron in second hands have been sold at from $15.50 to $16 at valley furnace and in one instance $15.25 in the valley was touched. Yet furnacemen in the main have maintained their former attitude and have refrained from weakening the market further by offering iron at current prices. There is somewhat more Bessemer iron available for 1895 delivery than seemed likely a short time ago, production having increased in the past six weeks. It is figured that the rate of Bessemer production, estimated from the blast furnace figures of Sept. 1, if kept up for a year, would mean a consumption of nearly 10,000,000 tons of Lake Superior Bessemer ore. Yet if steel rail orders come up in the way some authorities are counting on, consumption will continue to maintain a margin over production. Foundry iron, which has advanced at a careful and steady pace in the past four months, is firmly maintaining the latest advances, both on Eastern and Southern brands. The heavy production of Bessemer through the concentration of so much furnace capacity on that metal, has permitted the market for foundry and forge irons to work gradually into a condition of unwonted strength, with a prospect that the present basis will be maintained for some months. Lake Superior charcoal iron continues strong, and short stocks give promise of even higher prices. Nos. 5 and 6 iron are very scarce and on these $16 at Lake Erie port is a minimum figure. Ferromanganese and spiegeleisen are higher and the demand for imports has materially advanced the price of foreign. One seller has placed 30,000 tons of spiegel in the Central West, a portion of it to come to Lake Erie ports by an all-water route from the seaboard. Steel has shared in the weakness of Bessemer iron. Billets for 1895 delivery have been sold at $23 to $23.35, Wheeling district, and at $23.60 to $23.90 Pittsburg, the sales being chiefly of speculative material. The comparative cheapness of late transportation, even at the advanced fall rates, has made possible the shipment of considerable material, chiefly billets and rods, from the Chicago district to Lake Erie ports, some of it for reshipment to points in the East. Prices on these sales have been slightly below those of mills nearer destination points. Plates are lower, through the competition of Western and Pittsburg mills for business. The Superior order for 3,000 tons of plates went to Chicago. In other finished material lines, prices are maintained. Wrought pipe manufacturers have made an advance varying from 5 to 10 per cent.

THE CLEVELAND DISTRICT.

Inquiries for Bessemer ores are still made daily by furnace firms who find that their allotment to run until May must be pieced out. But mining companies, by all methods of contriving—even by the very unusual procedure of transferring ore from the docks of one line to the tracks of another line that can reach the furnace—are not able to take care of all these eleventh-hour needs. All recent sales have been on the basis heretofore stated, $4.40 to $4.50 for standard Bessemer hematites and $4.75 to $5 for hard Bessemers. Among recent purchases, a total of 100,000 tons was taken by the leading Western interest at the advanced prices. Steel rail orders have been accumulating in the hands of this concern, until the total has exceeded calculations, a goodly tonnage having gone upon its books in the past ten days. Reports from the Marquette range tell of a resumption of work, but forces are not full and will not be until men can be brought from other points. The movement of ore is heavy, though not so heavy as in August, a number of short-season contracts having been fulfilled. The total bids fair to exceed early calculations. A close estimate gives about 8,100,000 tons up to Oct. 1. The total through the American canal at the Soo was 973,521 gross tons in September. Estimating the Canadian canal's tonnage for the month and that of Escanaba and Gladstone—the former of which is now shipping about 90,000 tons a week—added to the official total of 6,672,051 tons to Sept 1, makes the season's shipments to Oct. 1 close to the figure given above. Ore freights, owing to the attractive offers on grain the past week, have gone higher. Considerable chartering was done at $1.40, head of the lake, and in the past two days $1.45 and $1.50 have been offered, without diverting many vessels from grain. From Escanaba 90c has been paid and from Marquette $1.15.

Pig Iron.

Inquiries for Bessemer iron, said to be on behalf of a Western buyer, have been made in the past few days, and if the negotiations are closed for the tonnage under consideration, the speculative iron that has weakened the market for three weeks will be disposed of in large part. Furnacemen feel that their position has been strengthened by recent sales of steel rails on the basis of $28 in the East, and the fact that rail mills are quite well supplied with orders for the next 60 days, some of them to the end of the year. There has been no effort by valley furnaces, so far as we can learn, to make sales of iron at the current market price. The holdings of speculative iron that have gone upon the market in the past two

Continued on page 7.

THE CHICAGO OUTLOOK.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

The general feeling among dealers of iron and steel is one of quiet, and except in a few instances business has been rather small in the past week. The inquiry appears to continue, but buyers are waiting to see if prices will not be lower before making their purchases. Quotations have not been reduced, however, except on plates. In pig iron the week has been quiet, no sales of any large size being reported, while the total tonnage closed was only moderate. Bars were also in lighter demand; but one sale of any note was made. In soft steel, business has been good and the local mills have closed 18,000 tons of billets, rods and plates, and a large tonnage of rails in the past week. One contract for from 2,500 to 3,000 tons of structural steel was given out last week for elevated railway work, and a 400-ton contract for a viaduct. Other classes of material were in good demand, and prices throughout are unchanged, with the one exception noted.

PIG IRON.—The tonnage of last week was no larger than that of the week before, either for Northern or Southern irons, and as neither buyers nor sellers seem particularly anxious to do business at present, it is hardly likely that the present week will show any increase. Furnaces north and south are well sold up, and many are practically out of the market for some time to come. Southern iron has sold more largely than Northern, and several transactions of 500 tons each are reported. Prices are unchanged, but will be advanced 20 cents in two weeks to cover an advance in freight rates of 20 cents which will go into effect Oct. 15. This will make the total freight $3.85. A sale of 300 tons of gray forge was made last week by a local furnace, but aside from this, only a small business was done. Quotations are firm and unchanged.

Lake Sup. Charcoal	$15 00@15 75	Southern No. 2 Soft	$ @13 90
Local Coke Fdy. No. 1	14 00@ 5 00	South'n Silveries No. 1	15 25@15 75
Local Coke Fdy. No. 2	13 50@14 50	South'n Silveries No. 2	@15 15
Local Coke Fdy. No. 3	@13 00	Jackson Co. Silveries	15 50@16 00
Local Scotch Fdy. No. 1	14 00@14 50	Ohio Silveries No. 1	15 00@15 50
Local Scotch Fdy. No. 2	14 00@14 50	Ohio Silveries No. 2	14 50@15 00
Local Scotch Fdy. No. 3	12 50@13 00	Ohio Strong Softeners	15 00@15 50
South'n Coke No. 2	@14 00	Alabama Car Wheel	17 00@17 50
South'n Coke No. 3	@13 65	Malleable Bessemer	
Southern No. 1 Soft	@14 15	Coke Bessemer	

BARS.—One contract for 1,000 tons of bar iron is reported, and several others of smaller size. The inquiry continues fair, but the total closed is hardly as large as for last week. Prices are firm and unchanged. Common iron, 1.50c to 1.60c; guaranteed iron, 1.60c to 1.65c; soft steel bars from strictly billet stock, 1.65c to 1.75c.

BILLETS AND RODS.—The demand continues large, and sales last week aggregated 13,000 tons of billets, at $26 @$27, and 3,000 tons of rods at $34@$35. Prices are firm and there seems no likelihood of a decline.

RAILS AND TRACK SUPPLIES.—Orders taken last week by the local mills was quite a little larger than in any one week for some time. Mills are full of orders, and are not pushing for business. Prices are as last reported. Rails, $29 and up; splice bars, 1.65c to 1.75c; track bolts, 2.25c to 2.45c; spikes, 1.95c to 2c.

STRUCTURAL MATERIAL.—A contract was given last week for 2,500 tons of material for the elevated railway loop by the Union Loop Co. to a Pittsburg mill. An Eastern mill took a contract for 400 tons of steel for a viaduct. Otherwise business was rather quiet, owing probably to the advanced season, which largely shuts off small buying. Prices are unchanged. Beams and channels, 1.90c to 2c; angles, 1.85c to 1.90c; plates, 2.10c to 2.20c; tees, 2c to 2.10c. Small lots from stock are ¼ to ½c higher.

PLATES.—The local mill took a contract for 3,000 tons of ship plates to go to West Superior for the American Steel Barge Co., and general business was quite good. The inquiry keeps up well. Prices are a little lower, as follows: Tank steel, 2.10c to 2.20c; flange steel, 2.35c to 2.45c; firebox steel, 2.85c to 5c; boiler tubes, 60 to 65 per cent discount.

MERCHANT STEEL.—The business of the week has been good, and several season's contracts of fairly large size were given out. Orders for shipments on contracts are coming in rapidly. Prices remain as follows: Open-hearth spring, tire and machinery steel, 2.10c to 2.20c; smooth finished machinery steel, 1.85c to 1.90c; smooth finished tire, 1.80c to 1.85c; tool steel, 5.50c to 7.50c; specials, 11c and upwards; Bessemer bars, 1.60c to 1.65c.

SHEETS.—The market continues active, and a number of good orders were placed. Quotations are firm at 2.95c@3c for black sheets and 3c@3.05c for sheet steel. Galvanized sheets are in active demand at 70 per cent discount for mill shipment.

OLD RAILS AND WHEELS.—Several good sized lots of old iron rails were sold last week at prices ranging from $18.75 to $19.50. Old steel rails are in fair demand at $14 to $15 according to length, etc. Old car wheels are quiet at $13 to $14.

SCRAP.—Several large lots changed hands last week and the inquiry continues active. The market is very firm, as follows: Railroad forge, $15.50 to $16; dealer's forge, $13.50 to $14; No. 1 mill, $11; heavy cast, $12 to 12.50; axles, $18; cast borings, $6.75 to $7; wrought turnings, $8.25 to $8.50; axle turnings, $9 to $9.25; mixed steel, $12 to $12.50; stove plates, $6.50 to $7; heavy melting steel, $13.50 to $14.

IN OTHER MARKETS.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

Pittsburg. The conditions noted a week ago still exist in the local iron and steel market. We do not find that furnaces have receded from their position or that they are pushing for business, although a few valley producers appear to have some Bessemer iron yet to sell for 1895 delivery. The transactions of the week have been almost entirely confined to speculative iron, the holders of which seem quite desirous of selling now. The result is a weaker market. Sales of Bessemer were made as high as $16.75 Pittsburg, the early part of last week but lots have been sold this week at $15.50, valley furnace, equivalent to $16.15 Pittsburg. There are indications that a round lot of iron will be taken by an outside steel company, and if the purchase should be made there is little doubt that most of the iron in the hands of brokers will be taken off the market, with the result that prices will stiffen. Some Eastern iron offered in this market has been taken by furnaces in Central Pennsylvania. Sales of considerable amounts of foreign spiegel are reported to have been made through a local firm. It is argued by those who look for a reaction in Bessemer pig that the current consumption is ahead of production; but the demand upon the steel companies for deliveries in the latter part of the year and the early part of 1896 is the uncertain element. Billet orders slackened in early September and in the train of this condition came the re-sales of Bessemer pig with the intention of breaking the market. It is not expected that the feeling of hesitancy that resulted will give way at once to free buying, and meantime the market may simply feel its way along until the strong buyers give another sign that will be accepted as an index of their position. Foundry iron

is not quoted lower, but gray forge is about 25 cents a ton lower than the figure of 10 days ago, Southern forge iron being offered in this market somewhat more freely. A sale of 1,500 tons is reported at $13.25 Pittsburg, also a sale of 1,000 tons at $13 valley furnace. Billets are weaker in sympathy with Bessemer pig. Restricted production at certain wire nail mills has made it possible for some mills to sell billets which it was supposed would be required in nail making in the next few months. Sales are reported at from $23 to $23.35 Wheeling and a few lots have been sold at $23.75 to $23.90 Pittsburg. The chances of a billet pool were not improved by the Cleveland meeting of last week. Most of the current business, like that in Bessemer pig, is speculative. In finished material there is practically no change in price, except that plates are a trifle lower, this being due, it is alleged, to Western competition. We quote tank steel at 1.80c to 1.90c. The demand for structural shapes is mostly in small lots. We quote 1.65c to 1.70c for beams and channels. Makers of pipes and tubes have advanced prices in the past few days. Discounts are now 55 per cent on butt weld black, 65 per cent on lap weld black, 50 per cent on butt weld galvanized and 52½ per cent on lap weld galvanized. Muck bar and skelp iron are quiet at unchanged prices. Old material continues firm and in good demand. A sale of 1,000 tons of old iron rails is reported at $19.50 and of 500 tons of old steel rails at $16.50. Connellsville coke is now quoted at $1.60 for furnace coke, an advance of 25 cents. The leading makers settled the strike agitation last week by announcing a 6 per cent advance in wages dating from Oct. 1. This makes the new price for mining and loading room and rib coal 95.4 cents per 100 bushels, and for heading coal, $1 08 per 100 bushels. Coke shipments have been heavy of late. The estimated output of Connellsville ovens in the week ending Sept. 21 was 161,745 tons. The shipments were 8,814 cars, Pittsburg and points west increasing their receipts considerably.

Cincinnati. The business of the past week aggregates an excellent tonnage in foundry irons of every description. Bessemer and mill grades are comparatively neglected because of the extraordinary orders entered for them during the past three or four months. It is not surprising, but was expected there would be a lull in demand for these classes of iron. The phenomenal demand for Bessemer and basic tempted numerous furnaces from their usual products of foundry and mill irons into the Bessemer and basic fields, increasing the supply of Bessemer to abnormal proportions. There is an inadequate supply of cars to handle the traffic of the country expeditiously and with the recurrence of the fall trade in general merchandise, grain and cotton, with the suspension of navigation, the deficiency of transportation facilities will be still more apparent. The present output of the blast furnaces aggregates fully 850,000 tons per month. If the old maxim that "Iron is the barometer of trade" is true, it is reasonable to expect a revival of general business at once. The National finances are not in as healthful form as might be desired, but if the country is entering upon a fresh epoch of natural expansion and legitimate development, as many believe, the business sense and patriotic sentiment of the people will right the wrongs that may intrude and lead to general prosperity.

Buffalo. Although large orders have been reported in this territory, there has been no excitement and prices remain stationary. The consumers of foundry iron in this vicinity are adjusting themselves to the changed conditions. Some complain, and it certainly is a hardship to pay the advance for supplies, while they are still selling castings on the old basis of price; but the majority are perfectly willing to pay the present prices for their iron, for it means a much higher proportion for their earnings. Charcoal irons are in active request and growing scarce. Both consumers and furnaces begin to feel the lack of cars.

Struthers Furnace Changes Hands.

W. C. Runyon, of Cleveland, has purchased from Brown, Bonnell & Co., of Youngstown, the Anna furnace at Struthers, O., which for some time has been in the builders' hands for complete reconstruction. Brown, Bonnell & Co. expect to have the repairs completed and the furnace in blast by Nov. 1, and from that date up to May 1, when it is arranged that the change in ownership shall go into effect, mill iron will be made. On May 1, when the furnace is taken charge of by the new owners, the firm of Runyon, Stubbs & Co. will be formed, Mr. Runyon becoming again associated with his former partner, J. B. Stubbs, now of Chicago. The firm will operate also the Hall furnace at Sharon which Mr. Runyon now leases and will continue the iron ore sales agencies which Mr. Runyon now has. The Struthers furnace will have among other new equipment, when it starts again, two Cuyahoga blowing engines, now being built by the Cleveland Ship Building Co. The cylinders are 42 inches diameter with 54-inch stroke and the air cylinders will be 84 inches in diameter. Another engine which is to be installed will have a 40-inch cylinder with 48-inch stroke. The iron stoves are to be replaced by Kennedy stoves 70 feet high. The daily output will be brought up to 250 tons. It is the intention, when the new management comes in, to run on Bessemer iron.

A Foundry 65 Years Old.

In an article on the early days of the foundry industries in Pittsburg, the *Machinery Molders' Journal* has the following about a pioneer institution that has made a specialty of rolling mill machinery: In 1836 Abraham Garrison, nephew of Lawrence Kingsland, who had served an apprenticeship at the Jackson foundry ten years before, and from 1833 to 1836 had been employed as manager of the Pittsburg foundry, bought the interest of William Cuddy in the latter concern. Subsequently H. L. Bollman and A. Garrison purchased the interests of the other partners, and associated with them H. F. Bollman. The firm became known as Bollman & Garrison, remaining thus until 1851, when H. F. Bollman withdrew. In 1852 the foundry was removed from the original site to the present location of the A. Garrison Foundry Co., corner of Ninth and Bingham streets. For 65 years this foundry has made a specialty of chill rolls and heavy rolling mill machinery.

The Tin Plate Industry to Date.

According to the latest advices in our possession, there are at present in operation 33 plants rolling black plates to be made into tin or terne plate; these plants have an aggregate of 155 black plate mills in operation. Six of them are at present putting in additional mills to the number of 18, while there are four plants actually in process of construction, with an aggregate of 17 mills, making a total of 37 black plate plants with an aggregate of 190 mills. There are 37 coating establishments building or in running order to make tin or terne plate for general or special consumption, not, of course, including stamping concerns where the coating is added after the article is shaped. Many of the existing plants contemplate enlarging, and several new plants are projected.—[Tin and Terne.

WITH the dissolution on Oct. 1 of the Chicago firm of Fisher & Porter, Mr. Albert Fisher retains the office, 1025 Monadnock building, and will represent Wm. Tod & Co., of Youngstown, O. The company's well-known products are the Williams vertical high grade engines, especially adapted for electric railway and lighting service; the Porter, Hamilton engine, especially adapted for heavy duty in manufacturing establishments, rolling mills, etc.; also blowing engines, hydraulic cranes and accumulators, and heavy special machinery.

THE IRON TRADE REVIEW

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JUGGLED PROSPERITY STATISTICS.

We have no interest in the political use that will be made this fall of the statistics of the year's wage advances in various industries, except in having facts that bear directly upon the industrial prosperity of the country put in their true light. The people have grown so used to looking for information [save the mark!] on the tariff question in their party paper only when an election is close at hand, and are so reasonably assured in advance that what they read is printed to influence their decisions as to parties and candidates, that it is probable they are not moved, as they may have been one day, by supposedly convincing statistics, on the one hand, or impeaching editorials on the other. But the constant iteration of wage advances,—the printing of the announcement that on a certain day wages will be advanced in a given manufactory, and then the printing of the news of the advance in the past tense, on the day it is made; or the announcement that all the iron mills in a certain district will advance the scale rate with the beginning of a month, and then the telegraphing from each point in the district, where there is a mill, that the scale has gone into effect—these duplications and re-duplications, indiscriminately thrown together in the columns of the newspapers, create the impression that labor is being better paid in every line, exaggerate improved conditions and spread discontent among men whose employers are little, if any, better able to pay higher wages than in the latter part of last year. It was doubtless just this contagion of prosperity in print that led to the strike of the miners on the Marquette range at a time when the mining companies were untouched by the wave of advancing prices that had swept iron and steel workers to a higher wage basis.

It is the widespread harm, both to capital and labor, done by the careless and inaccurate publication about industrial movements, and the false deductions from them, that makes this species of partisan misrepresentation especially mischievous. While there may be some excuse for the duplications in news columns, arising out of the transmission of news from so many points, there is no excuse for the deliberate compilation of statistics in which these mistakes are repeated and rolled over and over for the sake of making a point. Two months ago the New York *World* printed figures pretending to show the number of men affected by wage advances in the iron trade in the three months preceding. The list was full of palpable duplications and exaggerations. A later effort has been made in the same direction by the New York *Herald*, a classification of industries, in which wages have advanced being given under the heads "iron," "wool," "cotton," and "other." In the iron industry the number of men whose wages have been increased is put at 188,000. The list is full of glaring inflations. The Carnegie Steel Co.'s employes, for example, are put down in a lump at 15,000, and later the various plants of the company are set down individually, the number of men being thus doubled. The same thing is done in the case of Mahoning and Shenango valley blast furnaces and rolling mills and of the Mesabi range mines. The whole range is put in on one advance and then individual mines for the same advance. The number of men employed at the various properties is also greatly exaggerated. Duplications readily detected amount to 44,000, or nearly 25 per cent of the whole number.

As we have said before, the improvement in the iron trade is good enough without any artificial inflation. But the aggravating feature of these exaggerations is that those guilty of them have the audacity to claim that the better times on which iron and steel manufacturers have fallen are due to the tariff act. The argument seems to be about this: A tariff bill has been passed which reduced duties on many iron and steel products. Nine months after the passage of the act a revival of demand for iron and steel products appears in the United States. Therefore, the revival of demand and the advances in wages attending it are the result of the reduced duties on iron and steel.

To test the fairness of those who have put forth this remarkable syllogism, let us compare their present argument with some of the statements they made when they were clamoring for reductions in iron and steel duties. We recall something like the following strain, which has been played for years in tariff reform newspapers, with variations of one sort and another: "The iron masters of the United States, through a long period of protective duties, have enjoyed high prices and have made large profits, while wages have been reduced. Through the high prices of their products, home producers have been unable to sell in foreign countries; their market has been limited to the United States and a Chinese wall has been built around this country, preventing the proper expansion of the iron and steel industry. If duties are reduced, prices will fall, there will be larger importations of iron ore; the seaboard furnaces and mills will enjoy prosperity again, through their ability to enter foreign markets; our cheapened iron and steel products will go into new markets; the output of iron works will thus be greatly increased; consequently more men will be set at work; the increased demand for labor will raise wages, and workingmen, through the enlargement of our markets, will have more money with which to buy, while what they buy will be cheaper." And so on, for quantity. If we remember aright, no account was ever taken by those who wove this flimsy fabric, of the difficulties one would expect to find in raising wages on declining prices, or of the fact that seaboard furnaces and mills have long enjoyed the privilege of a rebate of practically all the duty on imported raw materials entering into whatever they shipped abroad as finished product, but without building up any foreign trade worth mentioning in competition with the low-wage iron products of England and the lower-wage products of Germany and Belgium.

To summarize: the things always emphasized by the

tariff reformers as the sure results of lower iron and steel duties, are lower home prices, higher home wages, enlarged trade abroad, larger output for mills.

The things that have happened in the iron trade of the country in the past six months, are higher home prices, and hence higher home wages, with practically no increase in exports. The cardinal elements in all tariff reform theorizing, the main props in every argument against protection, namely, low prices at home and a great expansion in our trade abroad, have been utterly lacking in the splendid revival in the iron trade that started last April.

Let those who assert that the new tariff act has had to do with the revival of the iron trade, compare the conditions to-day with their own detailed predictions and show, if they can, wherein their program has been carried out in any particular.

The facts are that the new tariff of to-day is not the tariff advocated by those who are now claiming prosperity as a fruit of low-tariff legislation. The wages of to-day in the iron trade, with all the advances made, are considerably below those which prevailed before the passage of a lower tariff bill was assured. The enlarged demand for iron products is a home demand, following upon a long starvation of consumption. When wages were at the low level of 1893 and 1894, when industry was struck with the double blight of a money panic and of the fear, well-grounded then, that a large influx of competitive products would result from lowered duties, prices of iron products in the United States were on a basis in some cases below those abroad. The revival sent them up again to heights that not only dashed all dreams of exporting for the capture of the markets of the world, but added very materially to the total of imports.

The conditions to-day in the American iron trade contradict all the prophecies of low tariff advocates; and the effrontery of marshaling wage figures to impeach the protective policy is only equaled by the falseness of the theories they are used to bolster.

THE CLEVELAND DISTRICT.—Continued from page 3.

weeks involve a considerable tonnage. Sales have been made at a considerable range of prices, $16 at valley furnace being the figure on a few lots for 1895 delivery. Later sales were at $15.50, valley furnace, and it is reported that $15.25 has been touched. Producers are confident that the ground apparently lost will be recovered in the buying that is just ahead. Foundry iron is quite as strong as at any time in the past month; on some grades producers are sold up and are not able to quote. No. 2 Scotch iron is now sold at $14.50 in the valley. No. 1 strong iron is sold, as in the preecding week, at $15 at furnace. There is less firmness in gray forge. A sale of 1,500 tons has been made at $13 in the valley, or 25 cents lower than sales of two weeks ago. Southern forge is selling somewhat more freely. Charcoal iron is in great demand, and as the end of navigation approaches Lake Superior furnaces note a livelier inquiry, with sales readily made at quoted rates. One large producer withdrew from the market some weeks ago. Another reports that it is sold up for three or four months ahead, and that Nos. 5 and 6 iron are especially scarce. One sale is noted at $16.50 Buffalo. Transactions for standard grades have ranged from $15.75 to $16 Lake Erie port, the past week. Offers have been made on several round lots to be brought down in the next sxi weeks and held to be resold, but the disposition of furnaces is to hold their iron to meet the requirements of their customers. The coke strike which was postponed by the agitators until Oct. 10 has been postponed indefinitely by the wage advance of six per cent announced last week. Furnace coke was advanced from $1.35 to $1.60 Oct. 1, but furnaces are not affected for the present, nearly all having contracts to the end of the year.

Finished Material.

Pittsburgh took the plates and shapes for the two steel steamers to be built at Detroit, the total being close to 2,000 tons for each. For the American Steel Barge Co.'s new steamers, the plate order went to Chicago; the shapes have not yet been contracted for. With the exception of plates, on which the Pittsburg minimum is about $1 a ton lower, there has been no weakening in the price of finished material. Outside the contracts mentioned the demand has been only moderate. Some fair lots of structural material have been booked in the local market at the prices of last week—a Pittsburg basis of 1.65c to 1.70c for beams and channels. Tank steel is quoted 1.80c to 1.90c Pittsburg. The influence of Western competition is still apparent in territory naturally tributary to Chicago. Some sales of billets and rods are reported the past week, to be shipped by water from Western mill and from Lake Erie port to go by rail to Eastern points. In the Cleveland district water transportation has played an important part also in recent sales of foreign spiegel. Steel canal boats carrying rails to the East will bring spiegel as a return cargo. Billet makers are still discussing the pool, which is being urged from New York, but agreement seems hopeless.

Mining Engineers' Atlanta Meeting.

For the Atlanta meeting of the American Institute of Mining Engineers, which begins Tuesday, Oct. 8, the following papers bearing on the iron and steel industry have been prepared:

Southern Magnetics and Magnetic Concentration, by Harvey S. Chase, New York.

The Magnetization and Concentration of Iron Ores, by Wm. B. Phillips, Birmingham, Ala.

Magnetic Separation of Iron Ore, by C. M. Ball, Troy, N. Y.

The Geological Structure of the Western Part of the Vermilion Range, Minn., by H. L. Smyth, Cambridge, Mass., and J. R. Finlay, Virginia, Minn.

A Section of Rich Patch Mountain at Iron Gate, Va., by E. J. Schmitz, New York.

The Determination of Graphite in Pig Iron, by Porter W Shimer, Easton, Pa.

A Comparison of Recent Phosphorus Determinations in Steel, by George E. Thackray, Johnstown, Pa.

Steel Rail Specifications, by Robert W. Hunt, Chicago.

The Utilization of Southern Iron Ores in the Blast Furnace, by John Birkinbine, Philadelphia.

False Economies in "Saving" Old Things.

That shop is a happy exception that is not lumbered up with a lot of machines or pieces of machinery that have been used for experimental purposes. The thing may have been all right, or it may have lacked just one little idea; still, the remains in either case are now worthless, but they must be kept hanging around for years and years simply because they cost money. If such things must be permitted to still cumber the ground, let the establishment possess a museum, where alone they may be considered sacred and safe from destruction. There is a constant temptation in the general or jobbing shop to work in old material—to utilize it. To use a thing is a straightforward and simple operation, but to utilize it is a very different thing. It is not useful, but we contrive to make it useful by cutting and shaping and working it down, or too often by changing our plans from just what we want to what we can just get along with after considerable sacrifice of time and brains. This idea that things that have cost much money are to be hung on to after they have become utterly worthless runs all through the trade, and only to its hurt.—[American Machinist.

THE MANAGEMENT OF MEN.

BY HERBERT M. RAMP, SPRINGFIELD, MO.

Recent discussion in the Western Foundrymen's Association has directed attention to the need of good mechanics, to the apprenticeship system, and to the fact that our molders of to day are not as able and thorough mechanics as molders were 20 years ago. The truth of this cannot be denied; and it is also a deplorable fact that good, all-round mechanics are rare, in fact very rare. Far be it from my intention to look upon the dark side of our mechanical progression, but it sometimes appears that there is a retrograde movement in our trades to-day, compared with the past, as far as general mechanical ability is concerned. Some one has said recently that molders are growing more to be specialists. The one who can make engine castings cannot make grate bars, and he that makes grate bars cannot make sash weights. This is largely true and is one of the greatest obstacles to the production of good molders.

Competition has made employers drive their men to this condition, to meet prices. To uphold wages, the mechanic has been compelled to become a specialist so he could produce a sufficient quantity. The constant repetition of work, making the same casting day in and day out, for months and even years at a time, has almost resolved him into a mere machine. Continued practice on one casting or one grade of castings has habituated all his movements and energies to that one line. The work is accomplished through habit, and his brain power is seldom called into play. If he thinks, it is of his home, his pleasure, or the time he will have with the boys at night or anything but his work; and why? Simply because his brain force is not called into play on his work, and he gradually acquires the practice of hardly ever thinking of it. When a man's abilities are left to lie and rust, when the faculties he was endowed with, or in youth cultivated partly, are left unused, in time they become worthless in any direction but the one in which they are used. The closer a mechanic is confined to one class of work the more narrow his ability. Often men who are unexcelled in one branch or on one job, utterly fail at anything else, both as to speed and quality.

This specializing tendency is unquestionably an immediate benefit to the employer. Work can be made cheaper and better, which the same workmen execute the year round, and it is also often impossible for a good mechanic to duplicate the day's work done in many of our foundries. This he must do or give room for men that can—which means to him he must become a specialist, or hunt a new situation. I do not believe this condition will be much improved. It was only a few years ago when a molder was expected to understand how to make his own cores, run the cupola, and in some cases make his own coke, or when a machinist was expected to run any tool in the machine shop or work on the vise or on the floor, or do any work at all connected with machinery. Now this is all changed. Rapid work of perfect quality requires undivided attention. Nearly every mechanic of any account excels in some particular line. The work made has to be done better and in some cases there is a man to finish every different part of an engine as well as mold it. From the demands that are made upon the manufacturer at the present day, it is necessary that such things be and the development of our business even demands that we specialize more, not only in men, but in plants to manufacture individual articles. For these reasons, it is hard to say our molders show less ability than those of 20 years ago; for if the latter were placed in our foundries now, they could not possibly accomplish the day's work performed.

This trouble is not confined to the molders' work alone. It shows its effect on their lives and habits. When their mental abilities are left unused and greater physical exertion required, the mind runs off in other channels, after pleasure or excitement. For example, the most of the trouble caused by strikes, and the greater number of drinking molders, are found among the stove-plate or other specialist molders; or it may be the man who works down in the corner on grate bars the year around. Such work is constant repetition. Possibly the same man will make the same casting for ten years. He is paid for good castings, which he makes. He has no voice in the improvements of the shop or the castings he is working on; no responsibility but his own labor. And this grows to be simply a monotonous round for so much remuneration. His mind loses its activity in business and as the old proverb fittingly says, "An idle brain is the devil's workshop," other things come in and fill his mind and ambitions, be they good or bad, are fed.

These conditions have been brought about of recent years through these causes and a few other attendant ones. The apprentices we have taught have been pushed into the same groove. To improve this condition our education must begin with them when they first enter the shop The foreman and proprietor should consider the young man's welfare and mechanical success as their interest, both from a humane and a financial standpoint. A young man is but a boy, an older man a grown-up boy, and the emotions, ambitions and desires in all are very similar, be they employer or employee. Every young man, worthy to be called a man, has an ambition to succeed in business, and that in the right manner. His employers, or those that represent them, are his models and if they do not occupy a position that in his estimation is unapproachable, or unattainable, it is an easy matter to arouse his ambition and pride.

An apprentice should meet the most careful instruction, given in a kindly spirit. To meet a boy with a frown or harsh word when he makes an error; to cause him to fear those in authority, when he has done the best he knew how, will humiliate anyone and will encourage that don't-care disposition so often encountered in our foundries. I do not assume but what there are times when a severe reprimand or decided condemnation of work or practice are necessary, but when an apprentice does a good piece of work, or shows good judgment or construction in his method, recognize it and commend him. A few words of praise or encouragement often are the best incentives that can be offered. Every one likes praise, every one likes appreciation. If a man performs a hurried piece of work, or excels in what he produces, encouragement will be his greatest and best reward.

Too often superintendents or foremen hide themselves behind the name of the corporation they represent, and are accordingly regarded as natural enemies whose aim it is to procure all they can get for the least money. They lose all relation to their men as individuals. A little judgment, of course, and a varied line of action is necessary with different dispositions, which vary as the treatment must. If the apprentices feel that their employer is interested in them; if in trouble will assist them; if the best results of good workmanship are placed before them, the effect is always for good. Make them feel you believe in them, that it is possible they will some day stand in a similar position to their employes and the effort will not be wasted. Make them feel you would be disappointed if failure was ever written after their name, when they arrived at mature years. I say this for I know the influence of others on my life; and the praise and appreciation of my efforts were always the bright spots in my apprenticeship.

Human nature is the same in a foundry as in any other place, and to handle men and instruct apprentices, you must reach them through their humane side, through their affections and ambitions; not by cold, stern authority and iron-clad rules; not by driving, but by leading. The apprentices of to-day are the mechanics of 10 or 20 years hence; and if the molders of to-day are inferior to those of 20 years ago, it shows we lack something in our apprenticeship system, for mankind remains the same.

When apprentices are set at work at the business it should always be the foreman's place to watch them and give all necessary instruction. But judgment should be used here. It is sometimes better to permit a boy to make a bad casting than correct him before, for it often teaches him a lesson in a manner words would utterly fail to do, for there is much he must learn by experience. An apprentice should not be kept on one grade of work for months at a time. It should be varied as much as possible. As soon as he shows he is capable of executing properly what he is doing, put him on something else. By this I do not mean waiting until he produces perfect castings; but when it is assured he has grasped the principle. It is often necessary to change a boy's work when he does not even accomplish this, and some day bring him back to the old job. Let him work with different molders and on different floors. This puts him with different men and helps prevent

him from falling into ruts, and shows him different methods of work. Take particular pains that he receives the impression that a casting is not made in a particular manner because a certain molder made it so, but because there is a principle involved, and what that principle is. Teach him to study cause and effect, not good and bad luck.

Many of our older molders permit apprentices to go ahead and make their work wrong without a word of warning or advice. They fear if the boys advance too fast it will injure them. But this is not true. Every good mechanic commands his own price and always will, and the better mechanics we produce the better wages will be paid. As it is, the good mechanic has to offset the poor one and part of the profit from his toil goes to balance the account against the poor one. Hence it is to every one's interest to produce the best possible molders, and not to drag down any edifice of character that is being erected and build upon and gloat over its ruins.

It would sometimes be a serious matter to follow out the plans best for our apprentices where specialties are made, or large numbers of castings made from one pattern and the men are accustomed to the work. Changing is always attended with disaster and trouble, and would not be to the best interest of the firm. There is one fact, however, we should study before being too ready to say molders are going backward. Do not these men accomplish more work and better work in the line they are fitted for, than molders did 20 years ago? Do we expect to further our business as specialists or general founders? On these points must rest the future education of our apprentices.

Thus far I have spoken of molders and apprentices who are men and possess reason; but I am also aware we meet with a class of men and boys upon whom none of these things have any effect. Regarding them I would say, a man who does not possess sufficient manhood to appreciate fair treatment, or the boy who knows it all and can learn nothing, is better out of the shop. "A man's teachableness decides his usefulness."

Economy of American Ores Used in Germany.

Mention was made in these columns some months ago of the shipment to Germany of high phosphorus Lake Champlain ores for blast furnaces whose product was used in making basic open hearth steel. A Westphalian blast furnace owner, who has been experimenting with these ores, has given out some figures comparing the cost of American and native ores. The Lake Champlain ore (60 per cent iron) at works was $3.97 per metric ton, while native minette ore (38 to 40 per cent iron) averages about $2.20. In practice the American ore yielded 58 per cent iron and the minette ore 35½ per cent, the result being that the cost of ore per ton of pig iron produced amounted to 66 cents more in the case of American ore. The quantity of limestone was about equal in the two cases. In the case, however, of the pig produced from the minette ore the consumption of coke was about 250 kilograms higher, equal to 70 cents per ton. Other charges, such as labor, etc., amount to about 25 cents per ton, so that it has been found that, notwithstanding the extra first cost of the ore, it is possible to effect a saving of 16 cents per ton in the cost of producing Thomas pig by using American ore.

THE manufacture of emery wheels, as carried on at the Sterling Emery Wheel Mfg. Co.'s works at Tiffin, O., is interesting as showing the completeness and rapidity with which raw material can be transferred into a manufactured product with a minimum of hand labor. The emery is received in car lots, and elevated to bins, from which it is drawn through spouts to the mixing room, where it is mixed, and the wheels molded by machinery. Thence they are carried to the drying room and dried, and are then turned to size and again dried. When thoroughly dry, they are baked in ovens, the process requiring from four to five days. They are then "trued" in the machine room, after which they are ready for use. Every wheel is tested to double the capacity to which it is intended to run before being sent out. A special kind of wheel made of corundum for running either wet or dry is made from selected material.

AT the Biwabik mine, four steam shovels and 400 men are pushing stripping day and night.

THE RESISTANCE OF RIVETS.

Some time ago Mr. Dupuy was selected by the Ministry of Public Works, France, to make a special inquiry into the causes of deterioration of metallic structures. Experiments were first made on rivets and a number of conclusions arrived at. A few of them are as follows: Rivets were found to not exactly fill the rivet holes, but to clamp the plates together with a pressure that gives rise to a resistance to sliding equivalent to a weld, which resistance is greater as the limit of the elasticity for rivet material is higher. The effort necessary to shear rivets per square inch of the sections to be sheared is not less than three-fourths of the tensile strength of the rivets per square inch. Mr. Dupuy draws from his conclusions some rules for bridge work, among which are the following: The calculation of riveting cannot be based upon the permissible stress in the test bars, the coefficients of safety relating to the rivets not depending in any way on those adopted for the bars. A distance apart of 13 ft. is recommended between cross-girders, so as to reduce the stress on rivets. It is further concluded that if the secondary stress on rivets is not calculated and allowed for, the rivets may be expected to yield. In bridges of several spans continuous girders are to be preferred where there is no danger of settlement. With continuous girders the length of each boom from pier to pier does not appreciably change and the riveting of the cross girders and rail bearers is therefore less strained by the deformation of the bridge. This continuity should not extend over too many spans, as otherwise the efforts necessary to produce movements resulting from temperature changes become excessive. It is further concluded that in girders whose booms have a single web, and in those not horizontally braced above and below, vertical stiffeners are desirable.

A Valuable Iron and Steel Text-Book.

THE METALLURGY OF IRON AND STEEL. One of a series of treatises on Metallurgy, written by associates of the Royal School of Mines. Edited by Prof. W. C. Roberts-Austen. By Thomas Turner. London: Chas. Griffin & Co., Ltd. Philadelphia: J. B. Lippincott Co., 1895. Vol. 1. Price $5.

The volume before us is an octave of 367 pages, with 80 illustrations. Its author is a well-known English writer on the metallurgy of iron and steel, and this first volume of the series is devoted entirely to the metallurgy of iron. It is intended primarily for those connected with the manufacture of iron and steel and therefore presupposes some general knowledge of the subjects discussed. The author presents with no little fullness the early and modern history of iron, and thus indicates the steps by which latter-day achievements have been approached. Other chapter headings are the following: The Age of Steel, Chief Iron Ores, Preparation of Iron Ores, The Blast Furnace, The Air Used in the Blast Furnace, Reactions of the Blast Furnace, Fuel Used in the Blast Furnace, Slags and Fluxes of Iron Smelting, Properties of Cast Iron, Foundry Practice, Wrought Iron, Indirect Production of Wrought Iron, The Puddling Process, Corrosion of Iron and Steel. Foundry practice and the reactions of the puddling furnace have been dealt with in greater detail than is usual in works of this character, the author, in his research and in practical experience having paid special attention to these subjects. Foundrymen will find the treatment of the metallurgy of cast iron especially full and valuable. The volume is a most excellent summary, brought down to the present year, of the developments of actual practice in the manufacture of blast furnace, foundry and rolling mill products. It is clear, authoritative and rich in detail, and will take its place among the best that has been produced in iron and steel literature.

THE E. P. Allis Co., Milwaukee, has a contract from the Andrews Bros. Co., Haselton, O., for two heavy standard type vertical blowing engines. They will have blowing cylinders 84″ diameter with 60″ stroke and steam cylinders 42″ diameter with 60″ stroke. They will be equipped with Edwin Reynolds' patent discharge air valves and Julian Kennedy's patent receiving air valves in the blowing chambers. The steam cylinders will be fitted with the Reynolds-Corliss steam gear. These engines will be capable of delivering the air at a pressure of 25 pounds per square inch, with the engine running at a speed of 50 revolutions per minute.

LAKE SUPERIOR IRON MINES.

Ishpeming mines are taking back their old forces and getting in shape for a resumption of mining faster than those at Negaunee. Last week the Lake Superior Iron Co. had two balers at work on the water at its Section 21 mine, taking out 850 gallons a minute. It was expected that the mine would be in condition to resume production some time this week. The Section 16 mine has about 400 men at work. Before the strike 700 men in all were employed by the company. The Lake shaft, Salisbury and Foster mines of the Cleveland-Cliffs Co. are at work and 540 men are employed, as against 660 in all prior to the strike, leaving out the Hematite mine, at which operations stopped in June. The Lake Angeline has about 400 men at work. The three companies, it was expected, would employ 1,600 men this week. At the Winthrop, where work was resumed before the strike ended, there is a full force employed at the open pit and at the No. 2 shaft. The Jackson and Negaunee mines at Negaunee are at work. At the Lillie, only a few men were set at work, lining up and repairing portions of the shaft. At the Cambria, which is also under the direction of Supt. Maitland, nothing was done last week, the superintendent being absent in the East At the Buffalo mines, in the absence of General Manager Cole, no steps toward resumption were taken, but it was expected work would begin on his return. The Champion has a full complement of men at work and operations are perhaps on a larger scale than before the strike. Some new men have been taken on and the ore is now crushed as hoisted. There is talk of unwatering the Blue, but no definite steps have been taken. Of the 1,000 men employed about Negaunee before the strike, it is believed nearly all will be taken back by the companies.

The Minnesota Iron Co.'s mines at Soudan will employ as many men the coming winter as have been at work in the years of largest output. This means a force of 1400 to 1500.

At the Franklin mine on the Mesabi, a hoisting plant has been set up. The engines are 16x20, with five-foot drums, with link motion, and operation can be in balance or independently. Three-ton skips will be carried.

A contract has been let recently by the Adams Mining Co. for the removal of 150,000 yards of surface and 140 men will be employed on the work through the winter. The new Vulcan shovel is reported to have made a record of 1,000 yards in a single day recently.

The output for the Chapin mine during August was 58,000 tons in round numbers. The daily output exceeds 2,400 tons General Manager MacNaughton states that the present force of 800 men will be maintained throughout the winter. An examination of the Chapin pay roll for August, which contains about 800 names, shows that the men—miners, trammers, timbermen, laborers, etc., not including manager, captains or office force,—averaged $1.60 per day throughout the mine. The average for miners was $1.80. One crew of miners averaged $3.50 per day for the month, and many earned more than $2.00. One crew made as low as $1.40 per day. These figures established beyond question that the employes of the Chapin Mining Co. are earning as good, if not a little better, wages than the men of any similar corporation in the Lake Superior district.—[Iron Mountain Range-Tribune.

After a three days' strike, the demand of the miners of the Brotherton, at Wakefield, Mich., was granted, and $1.65 a day, company account, will be paid.

Detroit men are looking at the Rolling Mill mine, south of Negaunee, with a view to putting it in operation. The ore is high in silica.

The 1895 shipments from the Pioneer mine, upward of 30,000 tons, are about completed. There are now 250 men employed, many of them in construction and installation work on surface. With the extensive equipment purchased this season, there are prospects of a good output for 1896.

Lazaras Silverman, a considerable holder of Minnesota Iron Co. stock, is conducting explorations on Section 25, near Ely, on properties owned by him and associated Chicago capitalists.

The suit of the Auburn Mining Co. to obtain some leases of the Ohio Mining Co., was decided against the plaintiffs.

The Fayal Iron Co. is putting in a compressor and will work 10 steam drills. The output of the winter will be about 100,000 tons.

The Mastodon Iron Co., of Chicago, will surrender its mine on the Menominee range to the fee owners within a few months, the property being practically worked out. The ore on hand has all been sold. The total output of the Mastodon is 378,000 tons.

The Longyear-Bennett interest, which has done considerable prospecting on Lake Superior iron lands, is reported to have given orders to put its Mesabi mines in readiness for mining. The properties are in Section 29, 58-20, about two miles from Hibbing, Minn.

Extensive hoisting equipment has been ordered by the Lake Superior Consolidated Iron Mines for the Lake Superior mine at Hibbing, where two shafts have been sunk and work on two others will be pushed in the near future. Four hoisting outfits will be delivered this fall. Balanced cage hoists for four ton skips are called for, and the engines will be 15x20 double, with six-foot double drums. Band friction clutches will be provided, for adjustment to the different levels. The plants will be furnished by the Webster, Camp & Lane Machine Co., Akron, O., which has an order also for equipment for the Adams mine.

The new steam shovel at the Adams is expected to move 40,000 cubic yards of material a month, and its performance will be watched with interest. A cut 800 feet long is to be made and 250,000 yards of earth will be moved.

Personal.

Dr. William M. Sweet, of Philadelphia, who gathered the iron and steel statistics for the census of 1890, and who previously for many years occupied a responsible position in the office of the American Iron and Steel Association, was married Sept. 19th to Miss Henrietta Cressman Pifer, of Norristown, Pa.

Frank F. Amsden, who has been connected with the Lackawanna Iron & Steel Co., has accepted the position of manager of the furnaces of the Missouri Furnace Co., at St. Louis, Mo.

Lieut. Meigs, who has been visiting Russia as representative of the Bethlehem Iron Co., has returned to this country.

William N. Carpenter, of the Illinois Steel Co., accompanied by E. B. Lewis, has been in Pittsburg and vicinity inspecting steel plants.

J. J. Crowther, superintendent of the furnaces of the Ashland (Ky.) Coal & Iron Co., relinquished his position Oct. 1 and will make Youngstown, O., his residence. Mr. Crowther has had charge in turn of a number of furnaces in Pennsylvania and Ohio.

James Bainbridge, chemist at the Edgar Thomson laboratory, goes to Birmingham, Ala., as head chemist for the Alice furnace. Alexander McKenna, assistant chief chemist at the Duquesne works, has a position as head chemist for the Sterling Steel Co. at Demmler. Charles Hart, assistant chemist at Edgar Thomson, will be head chemist for the Calumet furnace at Chicago, and William Pierce of the Edgar Thomson laboratory has been offered a position as chief chemist by the Pittsburg Iron & Steel Co. at Soho.

Lieut. Col. Millard Hunsiker, representing the Carnegie Sheet Co.; Irving M. Scott, for the Union Iron Works, San Francisco; Gen. B. Williams, for the Cramps; Capt. E. L. Zalinski, for the Bethlehem Iron Co.; A. R. Whitney, Jr., for A. R. Whitney & Co., New York, E. Thurnauer, for the General Electric Co., are all in Japan seeking to secure contracts in connection with Japan's projected naval equipment. It is said on good authority that two warships and two gunboats will probably be placed in the United States.

THE Cuban insurrection has interfered with shipments from the Spanish-American Iron Co.'s mines near Daiquiri, for whose product Oglebay, Norton & Co., of Cleveland, are sales agents. The steamship Westgate, which brought a cargo of this ore to Baltimore last week, reported that Spanish troops have been stationed and that stockades will be erected at the property of the Spanish-American Iron Co., in and near Daiquiri. While the Westgate was loading her cargo of ore at Daiquiri, Spanish soldiers appeared, and two Spanish men-of-war arrived in the harbor. The troops surrounded the mines and placed men on guard along the railroad to the wharf in Daiquiri and on the wharf property. The mines of the Spanish-American Co. are situated in a country thick with filibusters, who have already stolen a steamship load of explosives, which had to be replaced from Baltimore.

DEEP WATER WAY AND IRON MINING*

BY HON. MARTIN PATTISON, SUPERIOR, WIS.

Our experience shows that untried theories sometimes constitute as strong argument, or as reliable a basis for sound and correct conclusions, as those that have been tried and proven. It is from that standpoint my remarks are made in reference to the probable results of a ship channel that will open the great lakes to unobstructed communication with the Atlantic ocean.

I speak as one largely interested in the ownership of the Chandler and Pioneer mines on the Vermilion range in Minnesota. From these there will be shipped this year about 600,000 tons of iron ore. This is almost one-fifth of the whole output of all grades of iron ore from the head of Lake Superior, and about one-sixteenth of the entire product of the great Lake Superior district for the year 1895.

If I believed the opening of the great lakes to unobstructed competition with the rest of the world would injure or destroy my property, the natural instincts of self-preservation would drive me to oppose with all my power the vast enterprise advocated by the International Deep Waterways Association. But reasonable theories and the logic of ascertainable facts point the other way.

It is conceded that the greatest beds of high-grade ores in America lie in the Lake Superior region in the United States and Canada, directly tributary to our inland water system. To them, therefore, the principal iron and steel manufacturers on this continent must look for a large portion of their ore supply. Thus, inevitably, they are interested in our welfare, and in the probable effect of new conditions.

The present year's output of iron ore from Lake Superior will be about 9,000,000 tons. It is unnecessary to suggest that it is an enormous body of partially raw material. Where does it go, and what becomes of it? None but an insignificant part is manufactured in the region where mined. The nearest manufacturing points are Milwaukee and Chicago, from 300 to 600 miles distant by rail from the mines.

The bulk of the Lake Superior ore product goes to Lake Erie ports—Cleveland, Ashtabula, Fairport, Erie and Buffalo. From these places it is reshipped by rail to interior points—Allegheny City, Pittsburg, Homestead and other towns. There it is manufactured into finished articles, and again reshipped on the railroads to wholesalers in the larger cities, and from them to retailers everywhere, till it finally reaches the consumers. Only an insignificant portion of it finds a market in foreign countries, because these interior manufacturers can not, after so many transshipments by rail, profitably compete with the products of other countries.

This is one of the great reasons why the trade of our foremost iron masters is almost wholly domestic. If there were an ample, free channel from the great lakes out to the sea, manufacturers could locate their plants near the mines, on the lakes, and there produce all the heavier forms of iron and steel, pigs and ingots, at figures which would enable them to compete successfully with any iron district in the world. I want to emphasize the point, without undue amplification, that the location of a furnace close to the mines is of great importance to an iron manufacturer.

The arguments in support of the position taken are too numerous to be treated in a space that would be reasonable in a gathering of this kind. They are such as are conceded to be in harmony with established principles. I shall refer to only a few of them.

Such a channel as this association advocates through the lakes will lower the cost of transportation and thus give ores to all consumers in the Ohio, Pennsylvania and other districts now depending on the Lake Superior mines for their supply, at considerably reduced rates—from 12 to 35 cents per ton below the present cost of carriage for lake freight alone.

This association demands 26 feet of water. The significance of such a channel is greater than we now fully comprehend. If we had a 20-foot channel, safe, freights from Lake Superior to Lake Erie could be reduced about 20 per cent. A vessel carrying 2,000 tons on our present depth of lakes and canals could carry 3,000 tons on a draught of 20 feet. If the rate is now $1 per ton—that is $2,000 per cargo—the same craft carrying 3,000 tons on a 20-foot channel, at 80 cents, would earn $2,400 per trip. This would give consumers a benefit of 20 cents per ton and the vessel owner a lump sum of $400, from which we should deduct $150 for trimming and extra fuel on account of the increased cargo, and there is still left $250, or 12½ per cent more than a vessel earns per trip under existing conditions. Apply this proportion to the 3,000, 4,000 and 5,000 ton loads that vessels now afloat could carry on a deeper draught, and to larger boats, drawing 26 feet of water, and the great saving in the cost of carriage is seen at once and is almost startling.

With a 26-foot channel out to the sea, we could supply larger amounts of ores required on the Atlantic coast at rates which would in a short time exclude foreign competition. And we would thus increase the strength and prosperity of the country by as much money as previously went to pay foreign mine owners.

By this means the annual output of ore would be still further enlarged and manufacturing plants of high and low grades, according to conditions, more evenly distributed over the whole country as the result of cheap transportation. With it new fields for investment of capital would be made, the demand for labor enhanced and every article of iron and steel be cheapened and the ever-increasing use of iron in the arts wonderfully extended.

Next, we would invade foreign countries with our products of iron and steel, and consequently enlarge the field for American capital, labor and transportation. These benefits would not be confined to the United States alone; they would accrue to the Dominion of Canada as well. Cheaper transportation through the great lakes will stimulate the prosperity of the whole continent, and establish more permanently the happiness of all the people in North America!

In a conversation with Col. Joseph Selwood, vice-president of the enormous Minnesota Iron Co., on the subject of deep water from the great lakes to the Atlantic, he said: "I can see no interests that would not be ultimately benefited by the completion of such a grand enterprise. Had it not been for the deepening of the channels between the great lakes, provided by the Government, there would be no cities or iron mining on the Marquette, Gogebic, Vermilion and Mesabi ranges. Every increase in the depth of those channels enlarges the mineral output, lowers prices, cheapens transportation, and benefits the people."

That is the position of one of the greatest miners and iron ore merchants in the world. As an owner of iron mines, I unhesitatingly add to this my confirmatory judgment. If, then, the great lakes channels could be deepened to their utmost available capacity and established out to the sea, it would be almost the final step in placing this continent where it could compete successfully in commerce and manufactures with all the nations of the earth. God grant that I may live to rejoice in that day!

* Read at the first annual convention of the International Deep Waterways Association, Cleveland, O., Sept. 24, 1895.

Hendricks' Directory for 1895-6.

The last edition of Hendricks' Architects', Builders', and Contractors' Directory of America well sustains the reputation won for this publication in the years that it has been a staple in all building lines. It contains 832 pages and over 200,000 names, addresses and classifications, comprising builders and contractors of material used in building industries, and lists of manufacturers and sellers of everything employed in connection with these industries. The work is so well known that it calls for no detailed description. The classification is minute and on logical lines, and permits of tracing every manufacturer, dealer, contractor and architect, by state and town, as well as by product. Similarly, the minutest article of building material can be placed, both as to manufacturers and sellers and the location of manufactory or jobbing house. Samuel E. Hendricks Co., 61 Beekman st., New York, are the publishers.

At Springfield, O., the W. C. Leffel Co., manufacturing turbine wheels, has been reorganized as the Trump Mfg. Co. Fuller Trump was elected general manager, and J. J. Hoppes, a prominent manufacturer, was elected president, he taking the stock formerly held by W. C. Leffel. The business of the concern is to be broadened.

ROLL LATHES AND ROLL TURNING

BY A. RANDOLPH.

Few machinists ever have an opportunity to see or learn anything of this peculiar branch of the machinist trade, and yet it is one of the most important and absolutely necessary means by which modern iron and steel works are enabled to

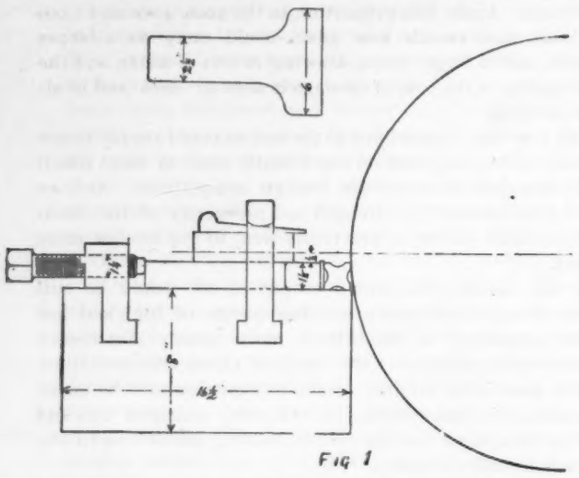


FIG 1

produce the many shapes of rolled iron and steel which are used for various purposes.

The modern roll lathe is in many respects the most primitive of all lathes. It has no slide rest or other means of guiding a moving tool along a straight or curved path. There are no chucks, mandrels or other accessories of that kind. It is strictly a turning lathe, there being no appliances for boring holes or facing broad surfaces. It has no "live" center, but it will be observed, by reference to engraving showing the gearing, that the face-plate acts simply as a driver, and rotates on a fixed spindle. The tail stock is similar to that on an engine lathe, except that it has no side adjustment. The centers in the roll are made with suitable chisels and finished by a center punch or reamer. The angle of the center is from 80 to 85 degrees. The only turning done on the centers is the journals of the roll, the body being finished while rotating the journals in suitable bearings. Roll lathes range in size from 24 inches to 72 inches swing, there being four or at most five sizes. The gearing is usually cast, but few if any having cut gearing. The two engravings showing a lathe with rolls in position for turning represent a lathe of 38 inches swing. The face-plate gear is two inches circular pitch and 75 teeth, and mating pinion 14 teeth. The next pair is 1¾ inch pitch and 60 and 15 teeth, and the last pair 1¼ inch pitch and 88 and 15 teeth. The step pulley has four diameters from 12 to 24 inches for a four inch belt. The pulley is geared to run 125 revolutions to one revolution of face-plate, and the slowest speed is generally such that it gives a speed of four feet per minute on the surface of a roll 24 inches diameter. The chief feature aimed at in the design of a roll lathe is to have it strong and massive so it will be as free as possible from deflection and vibrations. It is for this reason no sliding carriage is used, and the tool is held in a positive fixture as rigidly as required. In fact a roll lathe is a special machine for turning rolls, and is useful for that purpose only.

One of the most interesting and accurate jobs done on a roll lathe is that of the rolls shown in the engraving. They are rolls for rolling tin plates and fine sheet iron, and are 24 inches diameter by 32 inches long in the body, with journals or necks 18 inches diameter and 15 to 16 inches long. The surface of the body is chilled, so that when finished the chill is from ⅝ to ¾-inch thick. The tool used for this work is 8½ inches long by 1½ inch square, and of shape shown in Fig. 1, which shows the tool in position for cutting and the manner of holding and forcing it to the roll. A piece of copper is placed between the tool and the pusher to protect the edges, and all four courners of the tool are used before being reground. The tool is fed to the roll until it has a clean cut its full length all around the roll, and then the operator calipers to find if it is parallel. If not he slackens the feed-screw slightly and with light taps of a hammer at A, Fig. 1, he adjusts until it turns parallel. The final test of accuracy is made with a hardened steel straight-edge, which is rubbed lightly with fine chalk, and lying flat on the tool rest at height of center of the roll, it is rubbed gently endways to mark the roll. Rolls of this kind are always used in pairs, and the second roll of the pair having been roughed out to near the right size, the first one finished is mounted above it as shown in Fig. 2, and set in a crossed position so that when one end of the body of the top roll is directly above the center of the bottom roll, the other end of the top roll is set back 1½ inches. In this position it is held so it is free to revolve, but otherwise it remains as placed. The bottom roll is then turned until it fits the upper one the entire length so accurately that light cannot be seen by looking between them. The high spots on the bottom roll are marked by rubbing of the top roll, which, owing to being crossed, is compelled to slide endways on the lower roll as it revolves. No machinist needs to be told that it requires experienced skill to do such accurate work with such a tool and means of adjustment. When the rolls are set

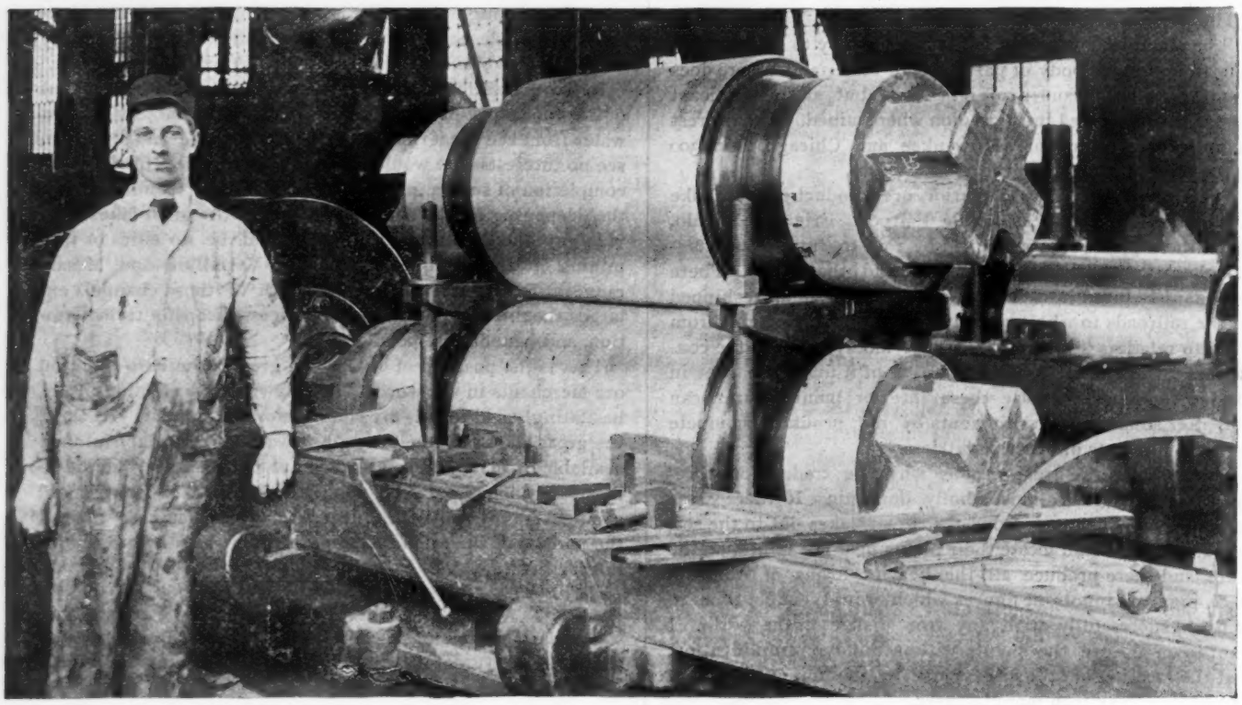


FIG. 2—TURNING THE SECOND ROLL.

parallel with each other after being finished, they stand apart at the center about .012 inch. The reason this shape is required is that when they are in use they become the hottest at the central portion and expand the most there. The amount of this expansion depends on the quantity and heat of the material rolled, and the consequence is they will not roll accurately until brought to and kept at a heat that will roll the sheets parallel. The thinnest sheets are finished in a pile of eight, so that a slight error of the rolls would only produce one-eighth of the error on each sheet that would be produced if one sheet at a time was finished.

These chilled rolls are very hard and can only be turned at a speed of about 40 to 48 inches per minute. It requires from ¼ to ⅜ inch diameter to be turned off, and a tool eight inches wide requires about four and a half hours to cut 3-16 inch depth. This takes off the metal at a rate of six pounds per hour, and as two tools are cutting at the same time it makes 12 pounds per hour.

Rolls that are not clilled are made of very strong close iron, and can be turned at a speed of 10 feet per minute. On the lathe described 100 to 110 pounds of iron per hour can be cut from rolls not chilled.

The rolls being turned on the body are driven by a short spindle connecting to face-plate, which is used to give some adjustability in the driver, so that if the roll is not set exactly in line with spindle the accuracy of rotation will not be affected.

The tools used for turning grooved rolls of various kinds are generally formed tools of the required shape to finish each groove at one cut, but the grooves are first roughed out with heavy tools having wide cutting surfaces and small top rake, the tool being supported by an iron post directly beneath the cutting edge, which post rests on a heavy plate lying across the lathe shears. All tools which project more than an inch or so beyond the rest are always supported by such a post, so they cannot spring under a heavy cut. Where facing is needed, such as the ends of the roll body, a heavy side-cutting tool is used, and is fed to the work by set-screws which go through the posts that fit the square bosses in the rest, one screw at front edge of the rest to feed the tool side-ways, and another at rear end of tool on opposide side to prevent the tool from twisting around on the rest.

The same housings or stands are used for smaller sized necks, by putting chucks of the proper thickness in the brass seats, and inserting the brasses in the chucks. The bottom brasses have a set screw to keep them against the end of the roll so it cannot move end-ways. The top brass is in an arm that fits easily on the post at the back, and the bolts in front can be removed so the arm will swing around far enough to allow the roll to be lifted out of place without moving the housings. For very heavy work another kind of housing is used, which resembles the center rest of an engine lathe, but is very heavy, and has a gap in which the tool rest is held so it can be adjusted up to different sized rolls.

The engraving is made from a photograph of a lathe in use and built in the shops of the Robinson-Rea Mfg. Co., Pittsburg, Pa. They have twelve roll lathes in use in their shops, all of their own build, and the present proportions are largely the result of their own experience in the use of them.—[Machinery.

ATLANTA'S MACHINERY EXHIBIT.

J. H. Allen, chief of the Department of Machinery of the Cotton States and International Exposition, Atlanta, has prepared for *Dixie* an article on the machinery exhibit. We make the followin gextract, which will indicate something of the characteristics of the machinery section, and the ideas that have dominated the management in gathering together the products of recent mechanical development:

"The educational feature has been uppermost in the conception and development of the machinery department of the Cotton States and International Exposition. It was sought first to have as complete a display as possible in those branches of the machinery trade in which the South would be particularly interested, and, secondly, to have the other exhibits cover the remaining field of machinery as fully as space would permit. The results have been most satisfactory. Nothing of any very startling novelty will be exhibited although there will be several machines of entirely new principle and design on exhibition. Among these will be a new process for the cleaning of cotton seed. A new baling process will also be shown. Pin and envelope machinery will undoubtedly prove itself a novelty to most visitors. Then there is a 100 horse-power gas engine, one of the largest ever built in this country and certainly the largest ever seen in the South. This engine will be run under the same severe service in the power plant as any steam engine for running an alternating dynamo. A 250 horse-power rope drive will probably also attract its share of attention from those who have never seen this old and yet novel mode of power transmission. Many exhibits might be mentioned, each possessing some novel feature of interest.

"Another thing will undoubtedly impress itself upon many. This is the large number of working exhibits. Machinery as a general rule is unattractive when not in motion. Even the machinery crank likes to watch the wheels go round, and it is a very strange person, indeed, who is not fascinated by the monotonous turning of a mighty fly-wheel, the rumbling grind of a pair of gears, or the restless reciprocations of a printing press or loom. There ought to be nothing sensational in machinery. A machine is built with a purpose. To attain the desired end with the least work, the least material, and above all the least embellishment should be the aim of every designer, and a piece of machinery is the more artistic, or the more beautiful in the eyes of a true lover of machinery, the more closely it is built in accordance with the three requisites named.

"When it was stated that there would be nothing of a very startling novelty in the machinery exhibits, there was no intention of conveying the impression that there would be nothing new, or even that a single thing in that great mass of apparatus would be old in any sense of the word. Improvements are being made every day in almost every branch of the machinery industry. Reduction of first cost is one of the ends that every manufacturer has in view, that he may sell his machinery as cheaply as his competitor. Reduction of cost of operation is another important factor to-day, the question of the consumption of a pound more or less of coal or the difference of an inch in the width of a belt being matters of grave moment which must be attended to or sales will be affected. Thus constant improvement is one of the requisites for success, and the out-of-date machine has found no welcome at the Atlanta Exposition, unless perhaps as a curiosity.

"Let no one be misled into the belief that the machinery building contains all or nearly all of interest in the machanical line. The Government Building is particularly rich in such exhibits; then the Electricity, Transportation, and several other buildings contain many displays which come within the province of machinery yet belong more naturally in the particular departments in which they have been placed.

"To be understood machinery requires study, and there is no machine so simple that a few moments, at least, cannot be devoted to it with profit. No machine exisis that does not involve at least one natural law; mechanical wonders are often marvelous in their conception, yet they are oftentimes so very simple in analysis, that they reduce down to a few mechanical motions which are combined in such a way as to produce the desired end. A truly practical man, speaking in the broadest sense of the word, never purchases a machine until he thoroughly understands it, or has studied it in comparison with others built to do the same class of work. In that way he buys intelligently, and he is the sort of man to whom the manufacturer desires to sell, knowing he will not abuse the machine, but will give it a fair chance and run it as it should be run. It is for such men that the machinery exhibit will prove to be of the greatest value and it is in the hands of such men that the future prosperity of the Southern States will lie, for in their coming commercial greatness machinery is bound to play a more and ever more important part."

MARION CRAWFORD is writing for the *Century* a series of papers on Rome and the Vatican for which André Castaigne is drawing the illustrations. The pictures will include some remarkable restorations of classical scenes. Henry M. Stanley will contribute a paper on Africa, to be supplemented by articles made up from the diary and journals of the late E. J. Glave, who died a few months ago on the Congo.

RECEIVED FROM THE TRADE.

The W. A. Jones Foundry & Machine Co., 57 and 59 South Jefferson st., Chicago, has just issued a new catalogue of its products. The company manufactures all classes of machinery for transmitting power and for handling material, whether in bulk or package; also mill and elevator supplies and general machine and electric castings. The catalogue is very complete, and contains illustrations, descriptions and price lists of pulleys, shafting, hangers, bearings, couplings, clutches, conveyors, etc. It will be mailed to any one upon application.

In a catalogue mechanically excellent and illustrated with clean and clear half-tones, the Gisholt Machine Co., of Madison, Wis., presents the features of the extra heavy turret lathes of which it makes a specialty. The company's experience is that these lathes are now used for work to which it was formerly thought turret lathe methods were unsuited. The varying types of these machines, in sizes swinging from 13 to 50 inches, are shown in the pamphlet, together with the universal tool grinding machine, which is the only exception to the company's rule of confining itself to lathes. Several pages are given up to cuts of tools required for finishing various pieces, for example, stuffing boxes, steel bevel gears, valve bodies and engine bonnets.

S. D. Kimbark, Chicago, in his latest catalogue, which is of handy pocket size, separates into departments the various classes of material handled—heavy hardware, tools and machines, carriage hardware, carriage trimmings and mountings, etc. Sizes, descriptions, prices and other details are given and several hundred miniature cuts are employed to illustrate the various articles belonging to so varied a line of manufactured iron and light machinery.

The Morse Machine Co., of Rochester, N. Y., sends out its first annual catalogue of draughting room furniture. The descriptions are accompanied by photographic reproductions.

Dixon's pure flake graphite, the solid lubricant which the Jos. Dixon Crucible Co. has been so energetically bringing into use in the past few years, is the text on which several scores of locomotive engineers write for the pamphlet before us. Fed with oil, it is the testimony of these engineers that for hot pins, for use on brake values, driving boxes, or any engine bearings, the flake graphite is exceptionally effective.

The Lodge & Davis Machine Tool Co., Cincinnati, announces that on March 1, 1896, it will give to the technical or mechanical school receiving the largest number of votes a 16-inch swing tool-room lathe. The votes are to be sent to the company and anyone interested in technical or mechanical education may vote.

In a 16-page pamphlet of pocket size, the Millett Core Oven Co., of Brightwood, Mass., emphasizes the fuel-saving and time-saving qualities of its patent core oven. The oven is made up of independent shelves, arranged for the quick and thorough baking of cores. Testimonials are given from foundrymen in various parts of the country who tell of the results they have had with the Millett oven.

The American Glutrose Works, 925 Chestnut st., Philadelphia, in a neat folder states its case for its universal core compound for iron, steel and brass foundries. Glutrose is claimed to be economical and to be a desirable substitute for flour and other materials, to mix with core sand.

"Motor Metal" is described in a little book just issued by H. C Cooper, 1419 Monadnock building, Chicago. It is a high grade friction metal, and is used extensively in railroad work, for electric motors, heavy and high speed machinery and shafting, and everywhere such a metal can be used. The book contains several pages in blank for records of tests made between motor metal and other metals, and such tests are invited. Mr. Cooper is the sole Western agent for the sale of motor metal.

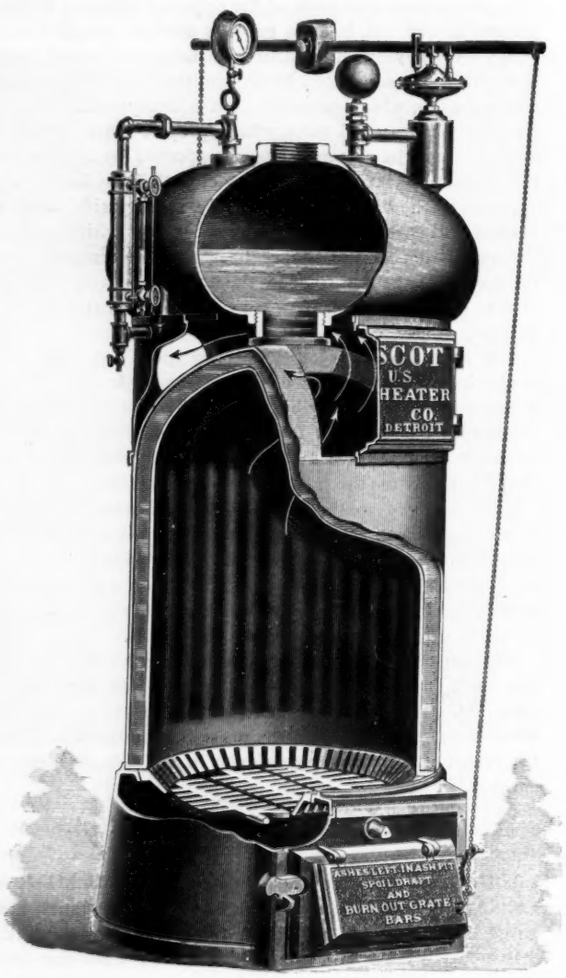
THE Detroit Dry Dock Co. has contracted with the Wolverine Steamship Co., of Detroit, to build a steel steamer of 400 feet keel, 45 feet beam, 23 feet deep—three feet less beam than the Victory and Zenith City but 20 feet longer. The cost will be $275,000. The Detroit Dry Dock Co. will build for C. K. Jones and others, of Cleveland, a steel single-deck steamer 254 feet long, 42 feet wide and 14 feet depth of hold.

THE MASCOT HEATER.

The Mascot heater, manufactured by the United States Heater Co., of Detroit, has proved one of the most efficient of the new small heaters on the market. It is made either for hot water or steam and is especially adapted for small heating plants, such as are required for small houses, flats, greenhouses, etc. It is made in three sizes which are rated to carry respectively 275, 375 and 475 feet of steam radiation, or 175, 250 and 350 feet of hot water radiation. The Mascot for steam is represented in the accompanying cut.

The body is a single, thimble-shaped casting, the top and sides of which are hollow, forming an unbroken waterway. This casting stands upon an ash pit and is connected at the top with a round steam dome. The only openings in the body of the heater are the one opposite the fire-door, one for the return pipe at the back of the heater, and the four-inch opening at the top where it is connected with the upper section, or dome. Below the dome is a smoke space, enclosed by iron plates. In the front plate is the fire-door and at the sides are clean-out doors. The smokepipe collar is at the back. The corrugated walls of the fire-pot present a great extent of surface to the direct action of the radiant heat, while the draft after striking the crown is deflected through the opening and passes up against and under the top dome and out through the smoke pipe.

The heater is simple in construction and arrangement. It is easily handled, easily set up, and easily cleaned. In setting



THE MASCOT HEATER.

it up there is only one joint to be made, and that is the right-hand nipple connecting the heater proper with the top dome. It is shipped in parts and can easily be carried into any cellar.

The grate has the arrangement for shaking and dumping which has proved so successful in the Capitol and Hecla heaters. The area of the grate is changed in each size, making the proportion of grate to fire surface uniform. Clinker doors provide means for keeping the grate properly cleaned without trouble.

This construction gives a high degree of efficiency, combined

with good combustion of fuel. The Mascot is gotten up in handsome style, perfect in workmanship and material. For hot water there is the same construction as for the steam heater, except that in place of the deep steam dome at the top a shallow water section is used. The circulation of the water is uniformly vertical, with no lateral water courses and no flat sections.

The Magazines.

Rudyard Kipling makes his last appearance as a teller of jungle stories in the *Cosmopolitan* for October. In the same number appears for the first time before an American audience, the now-famed Richard Le Gallienne in a plea for religion under the title of "The Greatness of Man." An important paper on "State Universities" is contributed to this number by Prof. Ely. Among the story-tellers are Hopkinson Smith and Boyesen.

Notable articles in *Outing* for October are: "A Bit of Blue Ribbon," by Sarah Beaumont Kennedy; "In Rugged Labrador," by R. G. Taber; "Héro, by Therese G. Randall; "Guns and Shooting," by Ed. W. Sandys; "The Great Dismal Swamp," by Alex Hunter; "Football," by Walter Camp, and "Moose Hunting in New Brunswick," by the late Edmund P. Rogers.

"French Roads" are described in *Lippincott's* for October by Theodore Stanton, and Marion Manville Pope writes of the "Highway of the World." "Inside New Guinea," by John Paul Bocock, describes Van Gestel's explorations. "Ethics and Economics," as discussed by Fred Perry Powers, shows that the world's business must be conducted on business principles. The complete story is "My Strange Patient," by Wm. T. Nichols.

With the October number, the *Century* closes its 25th year and 50th volume, and in celebration of this event special pains is being taken with the November number, which will have some notable features. The centenary of Keats, who was born in October, 1795, is the occasion for a group of papers on the poet in the October number. "How Men Become Tramps" is one of Josiah Flynt's unique contributions to sociology. One of the editorial articles deals with the question of "Money and Debts." "A New Suffrage Qualification" is discussed by Prof. Thorpe, of the University of Pennsylvania.

The Atlanta Exposition.

One of the greatest fairs ever known to America. Many features of the Chicago World's Fair and new ones. Open Sept. 18 to Dec. 31. Low rates via the Queen & Crescent Route. Write to W. C. Rinearson, G. P. A., Cincinnati, O., for printed matter.

ENGINEERS and owners of steam boilers will be greatly interested in the new preservative process now being successfully introduced by the Empire Boiler Cleaning Co., of 19 Whitehall st., New York. The process differs from others in that, while it rids the flues of all destructive effects of the water salts, it has been shown by long experience that it does not in any degree injure the metal of the boiler itself. On the contrary, by the combined oxidation of the iron and mercury, which forms one of the principal ingredients of the compound, a thin but perfect enamel coating is gradually formed about the tubes and plates which defies the corrosive action of chemicals usually found in feed waters and prevents incrustation. It is without doubt a discovery in its line and bids fair to become the standard preservative for all classes of locomotive, marine and stationary boilers. A pamphlet describing the scientific features of the discovery is mailed by the company to any applicant.

THE Lewis Foundry & Machine Co., of Pittsburg, has just installed at the works of the Atlanta Steel & Tin Plate Co., Atlanta, Ind., a large roll lathe. It is an exceptionally heavy tool, and is intended to take two 12-inch cuts at the same time on chilled rolls up to 30 inches diameter.

The Brooklyn Navy Yards are making some extensive additions to their machine shop department. They have just awarded a contract to the Lodge & Davis Machine Tool Co., of Cincinnati, for several heavy engine lathes to be used in manufacturing guns and other ordnance.

INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants:—

[If you are in need of machinery of any description, please notify *The Iron Trade Review* and we will put you in communication with our advertisers at once.]

Box 145, New Orleans, La., wants a two cubic yard or larger scoop dredge, accessible to the Mississippi River, or the machinery for same.

At Erie, Pa., several local capitalists, including C. M. Reed, have perfected plans for building a large foundry. A charter has been applied for.

J. B. W., 3555 Ellis ave., Chicago, wants to buy a second-hand lathe, about 25 inch swing, a 24 inch planer and a 30 inch back-geared drill press.

"A," Metropole Hotel, Chicago, wants to buy a corrugating machine and a punch, both to work on 20 to 30 gauge; give sizes. Also a circling machine.

At Massillon, O., the works formerly occupied by the J. H. & D. Lake Co., and idle since that company's failure, have been purchased by C. O. Olsom, who will start a foundry.

The Continental Cycle Co. has been incorporated at Chicago, with a capital stock of $50,000, to manufacture cycles. Incorporators, W. Irving Osborne, Albert S. Lauer and A. M. Farnsworth.

Proposals are wanted until Oct. 9 by the City of Cleveland, for two traveling cranes to be located in the north engine house of the Division st. pumping station. Address Darwin E. Wright, Director of Public Works.

E. C. Potter, Michael Schmidt and others have incorporated at Chicago the Potter & Hollis Foundry Co., capital $10,000, and the company has leased from the C. A. Treat Car Wheel Foundry Co. the grounds and buildings of that concern at East Chicago.

The Chicago Pressed Steel Co. has been incorporated by James W. Wilson, John M. Hoon and Edward L. Lamb, with a capital stock of $500,000. The company has secured eight acres of land at Chicago Heights, and proposes to put up a plant with a capacity of 250 tons a day. It will manufacture steel ties for railroad use.

At the office of the Supervising Architect, Washington, D. C., sealed proposals will be received until 2 P. M., Oct. 18, for all the labor and materials required for the steel and iron work of the fourth, fifth, sixth, seventh, eighth, ninth and tenth floors, and the roof, also the steel columns above third floor and the framing of iron stairs, etc., of the U. S. Appraiser's warehouse in New York.

New Construction:—

At the Baldwin Locomotive Works, at Philadelphia, an old building is being demolished and on its site a large shop will be built for the construction of Westinghouse-Baldwin electric locomotives.

The American Machine Co., Ltd., Pawtucket, R. I., will build a new foundry 225x60 feet. Enlargements will also be made to the core room, casting cleaning room, and an additional oven built to accommodate the dry sand and loam departments.

Buildings are to be erected at Akron, O., by J. F. Seiberling, Frank Reifsnider and others composing a company just formed for the manufacture of rubber tires for bicycles. For the present a portion of the Empire Mower and Reaper Works will be used.

The new machine shop for the Granger Foundry & Machine Co., at Providence, R. I., will be one of the largest and most complete in the New England States. The building is 110 feet wide and 306 feet long. The construction is similar to the Fuller Iron Works machine shop, also designed by the Berlin Iron Bridge Co., and heretofore described.

Fires and Accidents:—

At Chicago, fire in the plant of the American Cutlery Works caused $50,000 damage.

The National Tube Works will not remove any part of the plant to Glassport, as has been reported, or elsewhere.

The barb wire department recently added by the St. Louis Fence Co. to the American Wire Nail Mills, Anderson, Ind., is ready for operation.

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Proprietors of the CELEBRATED Mount Savage Fire Brick.

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General Purpose Forming Rolls—all sizes.
Tools for Boiler Shops, Machine Shops and general iron manufacturing industries.
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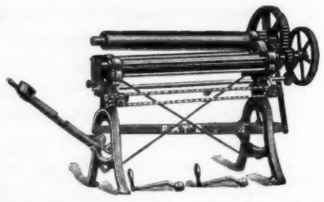

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OHIO FIRE BRICK. ALL SHAPES IN STOCK.

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CLEVELAND, OHIO.

The recent fire at the Knowles Steam Pump Works at Warren, Mass., was confined to the iron foundry and one of the pattern houses. The loss is $140,000, covered by insurance.

Additions, Enlargements, Removals, Etc.:—

The Champion Drill Works, at Avon, N. Y., are to be enlarged.

The Springfield (O.) Machine and Tool Co. has decided to build an addition 50x100 feet, which will employ 35 to 50 more men.

The Brownell & Co., of Dayton, O., are building an addition to their plant so as to be able to take care of the increasing demand for boilers and engines. They have closed with the Lodge & Davis Machine Tool Co., of Cincinnati, for the necessary machinery.

The Dillon-Griswold Wire Co., of Sterling, Ill., is making good progress toward the completion of its additional plant. The main building, 180x80 feet, three stories, has been finished and the machinery is being installed for drawing wire and making woven wire fence.

General Industrial Notes:—

An advance in wages has been made at the Troy Malleable Iron Works, Troy, N. Y.

The Pittsburg Wire Co., Braddock, Pa., is erecting a wire nail department at its works.

Dunbar, Pa., furnace is in good shape for a steady run through the winter.

The Reeves Iron Co. of Canal Dover, O., will begin the manufacture of black plates for tinning.

The Shenango Valley Steel Co., of New Castle, is shipping billets to Milwaukee, Braddock and Beaver Falls.

The old rail mill of the Edgar Thomson Steel Works, at Braddock, has shut down for repairs. The department will be closed for two weeks, during which some changes and additions will be made, increasing the capacity 20 per cent.

The extensive tube works plant now going up at New Castle, Pa., is expected to be ready for active operation Jan. 1.

The Hooven, Owens & Rentschler Co., Hamilton, O., has taken some large contract work in the East in the past week.

The No. 4 furnace of the Woodstock Iron Co., of Anniston, Ala., is to be enlarged to a capacity of 165 tons per day, instead of 100.

J. E. York, manager of the Ironton Structural Steel Co., Duluth, has just placed a $40,000 equipment contract in Pittsburg.

The shearmen's strike at the American Tin Plate Co.'s works at Elwood, Ind., ended in the introduction of new men by the company.

The Deer Lake Co. is removing old machinery from its furnace property near Ishpeming, Mich., to be shipped as scrap to Detroit.

A Muncie, Ind., paper reckons an increase of 1,235 in the number of employes in the various industries in that city in the past two months.

Excelsior furnace at Ishpeming, Mich., is being thoroughly overhauled and new machinery is going in. It will be ready to make iron by Nov. 15.

At the National Vapor Stove Works, Lorain, O., 40 men are employed on the manufacture of a new stove. The company has orders ahead for some time.

The surplus earnings of the Tennessee Coal, Iron & Railroad Co. for August were $59,188. For the same month last year there was a deficit of $22,000.

A new rolling mill has been put in operation at Denver, Col., by the Queen City Scrap Iron Co. Its daily product is at present 22 tons of flats and rounds.

The Altoona shops of the Pennsylvania Road have orders for 750 new freight cars. The Madison Car Co. is building 500

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5-lb. Can	$ 1.50
10-lb. Can	2.90
25-lb. Can	6.75
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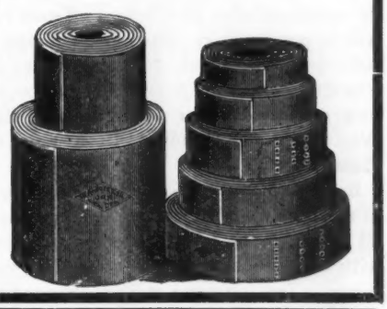

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Experts pronounce this invention most valuable, furnishing an inexpensive method for utilizing the soft and waste ores and thus reclaiming a large percentage of the most superior minerals.

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coal cars for the Missouri, Kansas & Texas. The Pullman Car Co. has sent the Philadelphia & Reading a first consignment of 1,000 hopper coal cars.

The Dake Engine Co., of Grand Haven, Mich., has been incorporated, with a capital stock of $60,000, by Geo. R. Wyman, W. P. Wyman, J. P. Armstead and others.

The Pittsburg, Shenango & Lake Erie road has placed an order with the Ohio Falls Car Mfg. Co., Jeffersonville, Ind., for 500 coal cars of 60,000 pounds capacity.

For the basic open-hearth plant under construction recently at the Apollo Iron & Steel Co.'s works, a 34-inch blooming mill has been installed and eight 24-inch sheet mills.

The two open-hearth furnaces at the Pittsburg Steel & Iron Co.'s plant are in operation and the plate mill is well employed. The galvanizing plant may soon be started.

The Bickford Drill & Tool Co., Cincinnati, has expected to tear down a portion of its old plant and rebuild this fall, but orders compel a postponement of this work until spring.

Six new boilers have been installed at the Johnson Co.'s plant at Lorain, O. These with the new heating furnace just put in operation will give the shape mill an increased output.

The Walker Foundry Co., Belleville, Ont., has been incorporated with a capital stock of $20,000 to carry on the business of iron and brass foundries, machinists, boilermakers, bridge builders, etc.

On the structural iron and steel work for the proposed Milwaukee library building the bids were: Wisconsin Bridge & Iron Co., $46,661; J. G. Wagner, $51,843; Wm. Bayley & Sons Co., $44,101.

The American Iron & Bolt Co., Cincinnati, O., operating sheet and bar mills at Newport, Ky., has been running its plant day and night for the past year and at present is operating with 800 hands.

The Julius Andrae & Sons Co., Milwaukee, has leased the building at Clinton and Florida streets, formerly occupied by the Filer & Stowell Co., and will use the plant for the manufacture of bicycles.

The Allegheny, Pa., city council have accepted the bid of the Edgemoor Iron Co., to furnish and set up six tubular boilers for the new water works, for $45,200, the boilers to be furnished with Hawley down-draft furnaces.

The Ohio Falls Car Mfg. Co., of Jefferson ville, Ind., has restored the 30 per cent reduction in the wages of finishers in the passenger department, which was made some months ago. The company has work ahead for several months.

A dispatch says that suit was begun Sept. 24 by Bowler & Co., of Cleveland, against the Pine Lake Iron Co., of Ironton, Mich., on a protested draft given in settlement of a cash deal made in 1893. A carload of iron rails stored at the furnace was attached on the claim.

A drop hammer recently made by the Pratt & Whitney Co., Hartford, Conn., for the Pope Mfg. Co., of the same place, has a hammer head weighing 2,000 pounds, and a base weighing 30,000 pounds. The total weight of the machine is 50,000 pounds, making it the largest drop hammer yet made.

The Diamond Machine Co., of Providence, R. I., has lately received a large order for its patent lever and screw feed lathe to go to a manual training school in California. This firm supplied Leland Stanford University with about 25 of these athes some two years ago. Several orders for large surface

grinding machines and for automatic knife grinders are also on hand at the Diamond works.

The foundries of Pittsburg are all very busy, turning out chill and sand rolls and other forms of equipment to busy rolling mills all over the country. The Frank Kneeland Machine Co. has just completed for the Granite City Steel Co., at Granite City, Ill., a pair of shears weighing 85,000 pounds, and to be driven by an electric motor.

At Gouverneur, N. Y., the Gouverneur Machine Co. has failed, with liabilities of $25,000; available assets unknown. The First National Bank held chattel mortgages, the foreclosing of which brought about the failure. The bank has so arranged that the shop will continue to run for the present. It is understood that a new company will be formed to rearrange and restock the plant, and that the business will be continued.

The magnetic iron mines at Cranberry, N. C., are about to be reopened after an idleness of two years. About 300 men will be put at work. The narrow-gauge road which runs from Johnson City, Tenn., to these mines is 34 miles in length. The Cranberry Coal & Iron Co. has begun the surveying of a new road from near Hampton, on the East Tennessee & Western North Carolina, to a new mine 15 miles from Hampton.

Bement, Miles & Co., of Philadelphia, report that their sales of machine tools to Sept. 1, 1895, have been larger than during all 1894. Among recent shipments is a lathe to San Francisco, with a 10½-foot swing and four independent carriages, which turns 50 feet long and weighs 350,000 pounds. Another shipment was to Buda Pesth, to the Government railway shops, consisting of a boring mill, planer and a large milling machine, and to Berlin one slotting machine, with 54-inch stroke.

A paragraph in the Buffalo *Evening Times* says that the new electric light plant at the county house of Erie county has been formally accepted by the supervisors' committee. The test made in their presence showed about one per cent variation in the voltage of the dynamo, between no load and 100 amperes, which means that it will require but little regulation as well as attention. A test of the engine, built by the Buffalo Forge Co., was also made and was gratifying to all interested. While the number of lights was increased a third, the cost of the plant was a third below the original estimate of $3,500.

The Cambria Iron Co. paid a 2 per cent dividend Oct. 1. The dividend after this one will no doubt be nearer the old-time standard. This company has not missed a dividend since the war; as high as 19 per cent has been declared in a single year. The panic of 1893 and the succeeding depression, brought it down to a 4 per cent basis, but the present shareholders, as well as those paying up in full the allotments for the new issue of stock to be made early this month, will participate in a stock dividend of 12½ per cent to be then made. The affairs of the company are in a very prosperous condition, and current business is both large and profitable.

Argument was begun in the United States Circuit Court at Philadelphia, Sept. 26, in the suit of Henry Roberts, George T. Oliver and Andrew J. Day against the Pittsburg Wire Co. and Thomas W. Fitch, its president, for alleged infringement on patented improvements in wire rod mills. The case originally came up in the court at Pittsburg, where an injunction was granted restraining the wire company from the continuance of the infringement. As to another claim of the patent, it was held that the invention in dispute was anticipated by the prior state of the art, and was therefore invalid and void. Both sides took appeals from so much of the decision as was against them.

In its Pittsburg column the *Machinery Molders' Journal* has the following about the foundry trade in that center: "In this city and in the valleys the foundry business seems to be in a much better condition than in any other part of the country, although prices and wages are low and there is little indication of any general advance in either. All of the foundries are fairly busy, some are even rushed with work and the prospects appear favorable for a good fall and winter trade. The advance in the price of raw material has not, as yet, affected the price of castings, and no advance either in mill castings or contract work is noted. Chilled rolls are still quoted at 3¼ and 3¾ cents; sand rolls 2 and 2½ cents; housings and squeezer castings 2 cents; pinions, spur and bevel gears from 2¼ to 3 cents.

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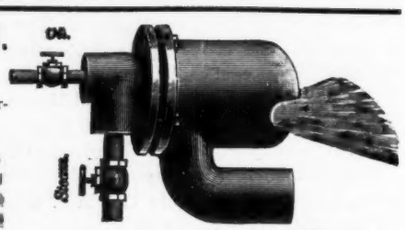

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21 and 23 Fremont st., San Francisco.

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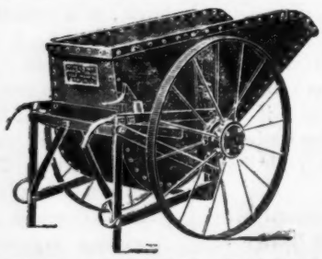

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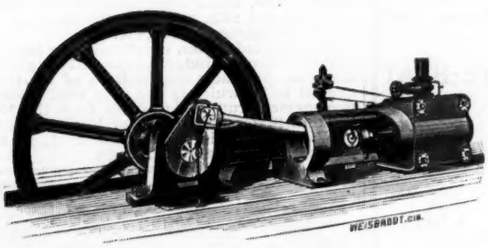

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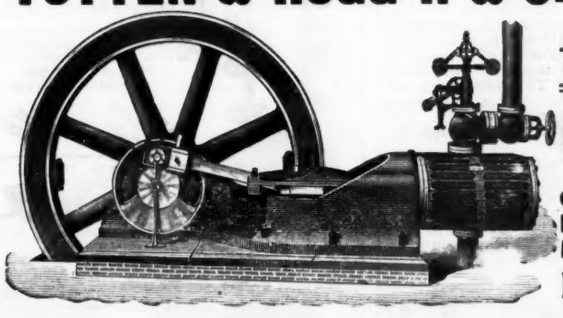

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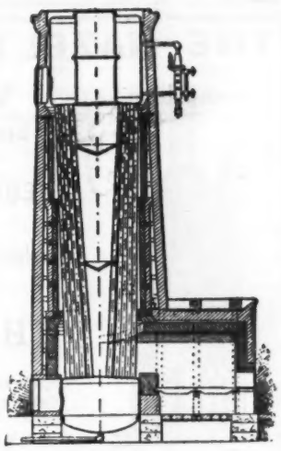

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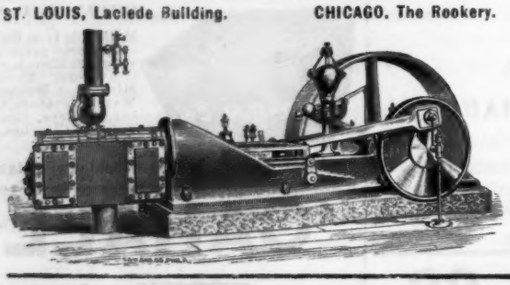

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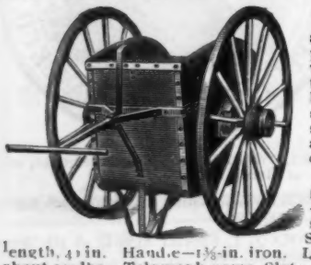

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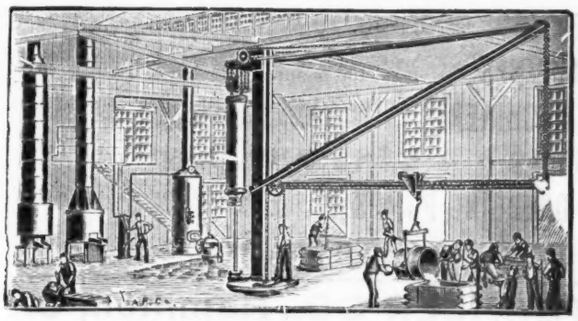

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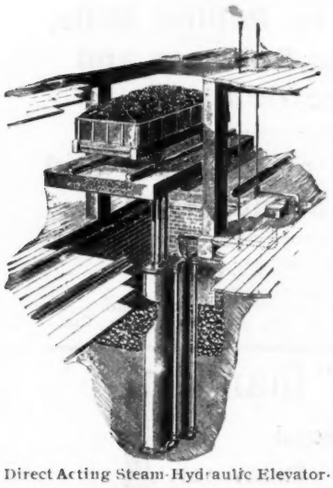

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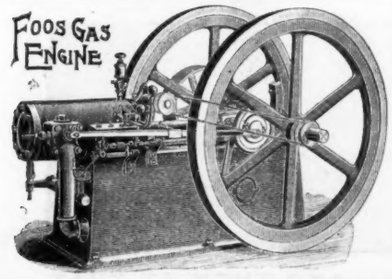

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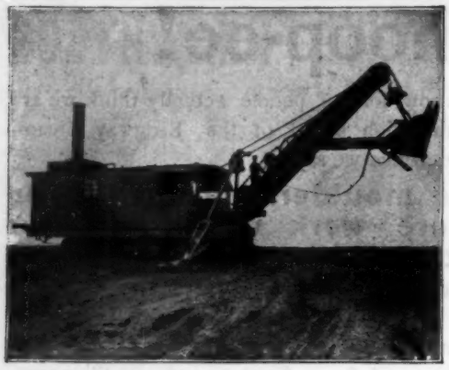

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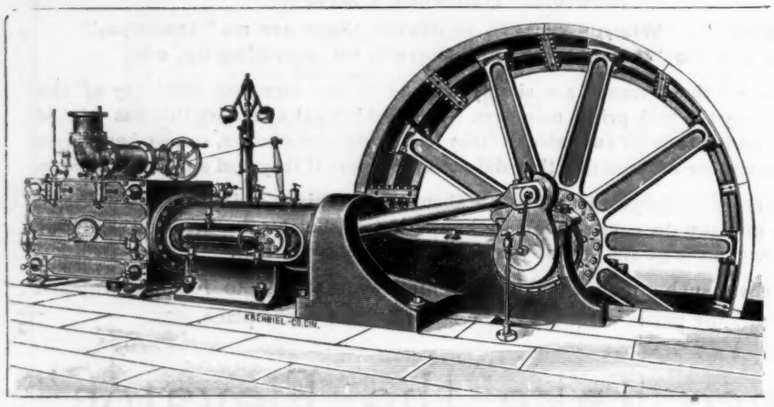

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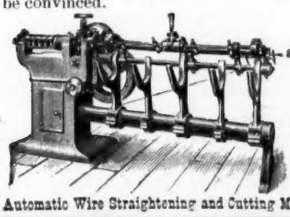

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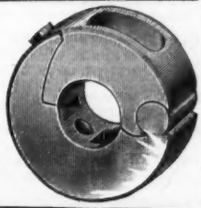

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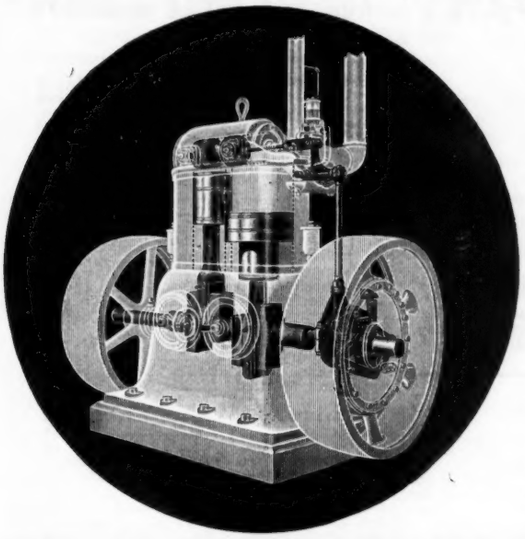

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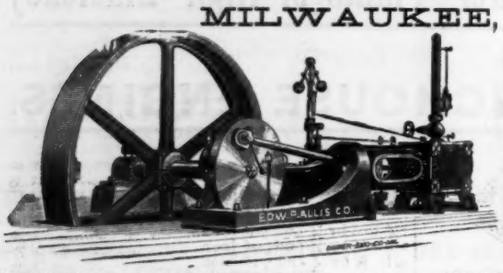

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No. 1 Gray Forge, red short	13 75@ 14 00
No. 2 Gray Forge, neutral	13 00@ 13 25
No. 1 American Scotch	15 65
No. 2 American Scotch	14 65@ 15 15
Lake Superior Charcoal	15 50@ 16 00

PITTSBURG:

No. 1 Foundry	$14 75@ 15 00
No. 2 Foundry	14 00@ 14 25
Gray Forge	13 50@ 13 90
White and Mottled	12 75@ 13 25
Warm Blast Charcoal	16 00@ 17 00
Cold Blast Charcoal	22 00@ 26 00
Bessemer	17 00@ 17 15

CHICAGO (reported by our representative:)

Lake Superior Charcoal	$15 00@$15 75
Local Coke Foundry No. 1	14 00@ 15 00
Local Coke Foundry No. 2	13 50@ 14 50
Local Coke Foundry No. 3	13 00 .....
Local Scotch Foundry No. 1	14 00@ 14 50
Local Scotch Foundry No. 2	14 00@ 14 50
Local Scotch Foundry No. 3	12 50@ 13 00
Southern Coke No. 1	10 70@ 11 00
Southern Coke No. 2	14 00 .....
Southern Coke No. 3	13 65 .....
Southern No. 1 Soft	14 15 .....
Southern No. 2 Soft	13 90 .....
Southern Silveries No. 1	15 25@ 15 75
Southern Silveries No. 2	15 15 .....
Jackson Co Silveries	15 50@ 16 00
Ohio Silveries No. 1	15 00@ 15 50
Ohio Silveries No. 2	14 50@ 15 00
Ohio Strong Softeners	15 00@ 15 50
Alabama Car Wheel	17 00@ 17 50
Malleable Bessemer	.....
Coke Bessemer	.....

CINCINNATI (reported by Rogers, Brown & Co.)

Southern Coke No. 1, Foundry	$13 00@$ .....
Southern Coke No. 2 and No. 1 Soft	12 75@ 13 00
Hanging Rock Coke, No 1	12 50@ 13 50
Hanging Rock Charcoal No. 1, Fdy	16 00@ 17 00
Tennessee Charcoal No 1	14 00@ 14 50
Jackson County Silvery No 1	14 00@ 15 00
Southern Coke, Gray Forge	12 50
" " Mottled	12 25@ 12 50
Standard Alabama Car Wheel	15 75@ 16 25
Tennessee " "	14 50@ 15 00
Lake Superior " "	15 50@ 16 50

BUFFALO (reported by Rogers, Brown & Co.)

No. 1 Foundry Strong Coke Iron Lake Superior Ore	$15 25@$15 75
No. 2 Foundry Strong Coke Iron Lake Superior Ore	14 75@ 15 25
Ohio Strong Softener No. 1	16 25@ 16 75
Jackson Co. Silvery No. 1	15 75@ 16 75
Lake Superior Charcoal	15 25@ 16 25
Southern Soft No. 1	15 15@ 15 65
Hanging Rock Charcoal	18 50

ST. LOUIS (reported by Rogers, Brown & Meacham):

Southern Coke No 1	$13 00@$13 25
Southern Coke No. 2	12 75@ 13 00
Southern Coke No. 3	12 50@ 12 75
Southern Gray Forge	12 25@ 12 50
Southern Charcoal No. 1	14 50@ 15 00
Missouri Charcoal No. 1	14 00@ 15 00
Ohio Softeners.	14 00@ 14 50
Lake Superior Car Wheel	15 50@ 16 00
Southern Car Wheel	16 00@ 16 50

OLD RAILS AND SCRAP METAL.

	Gross Tons
Old iron rails	$17 50
Old steel rails	14 50
Old Car Wheels	12 50
	Net Tons
No. 1 R. R. wrought scrap	$15 00
Mill scrap	12 00
No. 1 Machine cast scrap	11 00
Iron axles	21 00
Axle turnings	10 50
Wrought turnings (free from cast)	9 50
Cast borings	8 50
Uncut wrought iron boilers	7 00
Steel boiler plates	12 50
Grate bars	7 50
Pipes and flues (clean)	10 50
Tank iron	10 50
Hoop and band iron	8 00
Sheet iron	8 00
Wrought drillings	9 00
Malleable iron	8 00

STRUCTURAL MATERIAL.

Beams and Channels (Cleveland mill)	1.75c@1.85c
Angles	1.75c
Tees	1.80c@1.90c
Universal Plates	1.90c
Sheared Plates	2.00c

MERCHANT IRON AND STEEL.

[List prices out of store.]

Flat Bar.

1½ to 4 by ⅜ to 1 inch	1 60
1½ to 6 by ⅜ to 1 inch	1 65
1¾ to 6 by 1⅛ to 2 inch	1 80
1¼ & 1⅜ by ⅜ to ¾ inch	1 65
1 & 1⅛ by ⅜ to ¾ inch	1 70
½, ¾, ⅞, by ⅜ to ½ inch	1 80

Frank P. Cady, Pres. and Supt.
Geo. H. Bowler, Sec'y and Treas.

THE CADY MFG. CO.

18, 20 and 22 Johnson St., CLEVELAND, O.

SEND FOR OUR NEW CATALOGUE OF Power Presses, Drop Hammers, Punches and Shears, Wire Working and Special Machinery.

PERFORATED METALS

OF ALL KINDS FOR

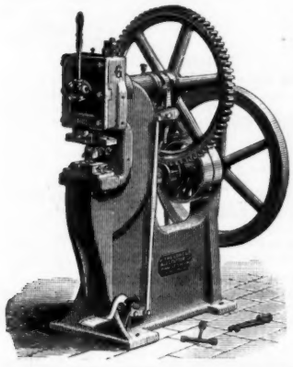
MILLING MINING AND AGRICULTURAL MACHINERY,

PERFORATED IRON, STEEL, COPPER, BRASS, TIN, ZINC, LEAD, ETC., TO ORDER.

LARGE AND VARIED ASSORTMENT OF SIZES. CORRESPONDENCE SOLICITED.

THE ROBERT AITCHISON. PERFORATED METAL CO.,

OFFICE, ROOM 510 265 TO 269 DEARBORN STREET, CHICAGO, ILL. WORKS SOUTH CHICAGO.



THE

LONG & ALLSTATTER CO.

HAMILTON, OHIO, U. S. A.

Manufacturers of Belt, Steam and Electrically driven

POWER PUNCHES AND SHEARS,

for all kinds of Boiler, Tank and Structural Iron Work, Rolling Mills, Locomotive Shops, Car and Wagon Shops, Plow Shops, etc.

Send for Catalogue. (3)

A. H. LEITCH, PREST. JOHN C. LEITCH, SEC. AND TREAS.

WESTMORELAND FIRE BRICK CO.

MANUFACTURERS OF HIGH GRADE FIRE BRICKS.

PITTSBURG, PA.

Works and Mines, Westmoreland, Pa.

PL DIXON'S PERFECT LUBRICATING GRAPHITE.

The most Marvelous Lubricant Known.
Used Dry, or Mixed with Water, Oil or Grease

NOT AFFECTED BY HEAT, COLD, STEAM OR ACIDS.

An Interesting and Instructive Pamphlet will be sent Free of Charge.

JOS. DIXON CRUCIBLE CO. Jersey City, N. J.

IRON CLAD PAINT CO.

Factory, 75 & 77 Central Way. Sec. & Treas., No. 3 Case Build'g,

CLEVELAND, OHIO.

ORDER DIRECT FROM THE

Iron Clad Paint Co.

And get the genuine article, and save liability of suit for using an article made in violation of the patents issued to Wm. Green, and now owned by this Company.

IRON CLAD PAINT is the most durable, most fire-proof and Cheapest Paint made.

FURNISHED both Dry and Ground in Oil

USED BY NEARLY ALL THE RAILROADS.

Round and Square.

1 to 1⅜ inch	1 60
2 to 2⅜ inch	1 80
2⅜ to 3¼ inch	1 75
3⅜ to 4 inch	2 10
4⅛ to 4½ inch	2 70
4¾ to 5 inch	2 90

Oval.

⅜ to 1¼ inch	1 80
⅝ to ¾ inch	1 80
½	2 00
⅝	2 20

Half Oval and Half Round.

1¼ to 3 inch	2 15
⅜ to 1¼ inch	1 95
⅝ to ¾ inch	2 20
½	2 35
⅝	3 45

Heavy Band.

1¼ to 6 by ¼ and 5-16 inch	1 70
1 to 1¾ by ¼ and 5-16 inch	1 75
¼ to ⅜ by ¼ and 5-16 inch	1 85
½ to ⅝ by ¼ and 5-16 inch	2 10

Hoop Iron.

1 7-16 to 4, No. 13, 14, 15 and 16	2 15
1 7-16 to 2, No. 17, 18 and 19	2 20
1 7-16 to 2, No. 20	2 30
1 7-16 to 2, No. 21	2 40
1 7-16 to 2, No. 22	2 50
1⅛ to 1⅜, No. 13, 14 and 15	2 20
1⅛ to 1⅜, No. 16, 17 and 18	2 25
1⅛ to 1⅜, No 19 and 20	2 30
1⅛ to 1⅜, No. 21	2 40
1⅛ to 1⅜, No. 22	2 50
15-16 and 1 inch, No. 13, 14 and 15	2 15
15-16 and 1 inch, No. 16, 17 and 18	2 30
15-16 and 1 inch, No. 19 and 20	2 40
15-16 and 1 inch, No. 21	2 50
15-16 and 1 inch, No. 22	2 60
⅞, No. 13, 14 and 15	2 40
⅞, No. 16, 17 and 18	2 50
⅞, No. 19 and 20	2 60
⅞, No. 21	2 70
⅞, No. 22	2 80
13-16, No. 13, 14 and 15	2 50
13-16, No. 16, 17 and 18	2 60
13-16, No. 19 and 20	2 70
13-16 No. 21	2 80
13-16, No. 22	2 90
¾, No. 13, 14 and 15	2 60
¾, No. 16, 17 and 18	2 75
¾, No. 19 and 20	2 85
¾, No. 21	2 95
¾, No. 22	3 05
11-16, No. 13, 14 and 15	2 85
11-16, No. 16, 17 and 18	2 95
11-16, No. 19 and 20	3 00
1-16, No. 21	3 10
11-16, No. 22	3 20
11-16, No. 23	3 30
⅝, No. 13, and 15	2 90
⅝, No. 16, 17 and 18	3 00
⅝, No. 19 and 20	3 10
⅝, No. 21	3 20
⅝, No. 22	3 30
⅝, No. 23	3 40
9-16, No. 13, 14 and 15	3 10
9-16, No. 16, 17 and 18	3 20
9-16, No. and 20	3 30
9-16, No. 21	3 40
9-16, No. 22	3 50
9-16, No. 23	3 60
7-16 and ½ inch, No. 13, 14 and 15	3 30
7-16 and ½ inch, No. 16, 17 and 18	3 40
7-16 and ½ inch, No. 19 and 20	3 50
7-16 and ½ inch, No. 21	3 60
7-16 and ½ inch, No. 22	3 70
7-16 and ½ inch, No. 23	3 80
⅜, No. 13, 14 and 15	3 80
⅜, No. 16, 17 and 18	3 90
⅜, No. 19 and 20	4 00
⅜, No. 21	5 31
⅜, No. 22	4 40
⅜, No. 23	4 55

Light Band.

1½ to 6 by ⅛ to 3-16 inch	1 90
1¼ to 6 by Nos. 11 and 12	1 95
1 to 1¾ by ⅛ to 3-16 inch	1 95
1 to 1¾ by Nos. 11 and 12	2 00
⅞ and 13-16 by ⅛ to 3-16 inch	2 10
⅞ and 13-16 by Nos. 11 and 12	2 15
¾ and 11-16 by ⅛ to 3-16 inch	2 20
¾ and 11-16 by Nos. 11 and 12	2 25
⅝ and 9-16 by ⅛ to 3-16 inch	2 35
⅝ and 9-16 by Nos. 11 and 12	2 40
½ by ⅛ to 3-16 inch	2 50
½ by Nos. 11 and 12	2 55

Wagon Box Iron.

⅞ inch, beveled edge, by Nos. 11 and 12	2 10
⅞ inch, " " " " 13 and 14	2 20
¾ inch, " " " " 11 and 12	2 25
¾ inch, " " " " 13 and 14	1 55

Sheet Iron.

No. 10	2 10
No. 12	2 20
No. 14	2 25
No. 15-17	2 35
No. 18	2 50
No. 20	2 65
No. 22-24	2 75
No. 25-26	2 85
No. 27	2 95

Steel Boiler Plates—1-4 in. and Heavier.

Tank	2 00
Shell	2 15
Flange	2 25
Marine Flange	2 60
Fire Box	3 70

Above includes plates 90 inches wide.

90 to 96 in. wide	½c. lb. extra
96 to 100 in. wide	1 c. "
100 to 104 in. wide	1½c. "
104 to 106 in. wide	special

American Cast Tool Steel.

ROUND, SQUARE AND OCTAGON.	cts. lbs
1 to 2 in. inclusive	08
9-16 to ½ in. "	08½

JESSOP'S STEEL —FOR— Tools, Drills, Dies, etc.

Established over a Century ago. Manufactory, SHEFFIELD, ENGLAND.

CHIEF AMERICAN OFFICE, 91 JOHN ST., NEW YORK.

WM. JESSOP & SONS, Limited.

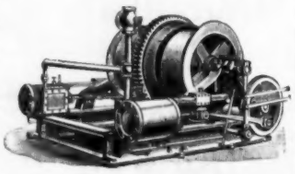
"Medal—World's Columbian Exposition, 1893."

All sizes carried in stock by The W. Bingham Co., Cleveland, Ohio.

HOISTING MACHINERY for Mining, Quarrying, Coal Handling, Pile Driving, Bridge Building, Log Hauling, and for general Contractors' Use. Improved Electric Hoists, single and double Patent Friction Drum, compound, geared with brakes and reversible for general Hoisting, Mining Purposes and Suspension Cable Ways.

Send for Illustrated Catalogue giving full description, etc.

CORRESPONDENCE SOLICITED



W. A. CROOK & BRO'S CO.

Salesrooms 143 Liberty st., N. Y 117-123 PIONEER ST., Newark, N. J.

W. H. COFFMAN COKE CO.

BLUEFIELD, W. VA.

GENERAL FACTORS AND SHIPPERS OF

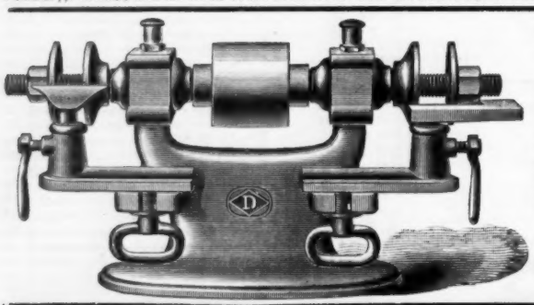
POCAHONTAS FLAT-TOP COKE.

So low in ash that it requires no fluxing for foundry purposes. Our foundry and furnace coke was awarded the first premium at the World's Fair in 1893.

AVERAGE ANALYSIS OF COKE.

Moisture	00.196	Sulphur	00.677
Fixed Carbon	93.625	Ash	05.004
Volatile Matter	00.494		

Foundry, Furnace and all sizes of crushed coke. Guaranteed lower in Sulphur than any other commercial coke



Grinding Machine No. 3

We make this machine in 9 sizes as below.

No. 1	carries	2	wheels	6	in. diam.
No. 2	"	"	"	6	" "
No. 3	"	"	"	9	" "
No. 4	"	"	"	12	" "
No. 5	"	"	"	14	" "
No. 6	"	"	"	16	" "
No. 7	"	"	"	20	" "
No. 8	"	"	"	34	" "
No. 9	"	"	"	42	" "

Diamond Machine Co.,

PROVIDENCE, R. I.

STEEL CASTINGS

OF EVERY DESCRIPTION

Made from Best Open-Hearth Steel.

SEND FOR ESTIMATES.

THE JOHNSON COMPANY, Johnstown, Pa.

The Most Satisfactory Fire Brick That Money can Buy

Our well known brands

"O. K." Crown, "O. K." and "A"

They have no equal when used for the purpose designated. They are good, honest, well made Brick, made to hold your trade.

OLMES, STRACHAN & CO., Agents. Detroit, Mich.

Oak Hill Fire Brick & Coal Co., Manufacturers, OAK HILL, OHIO.

7-16 to ⅝ and 2¾ to 3 in	.09
3⅝ to 4 in	.09½
⅝ to 11-16 and 4⅛	.10
⅝ to 6 in	.10½
¾ to 9-32 and 6⅛ to 7 in	.11
7 in	.13

Flats.

	cts. ℔
2 to 9-16 in. wide by 2 to ⅝ thick	.8

Bessemer and O. H. Steel.

Bessemer Machinery	base price,	1 50
Open-hearth Tire	"	1 80
Open-hearth Spring	"	2 20
Sleigh Shoe	"	1 90
Toe Calk	"	2 10
Cutter Shoes, tapered and bent	"	2 20

English Tool Steel.

Jessop's	15½c
Hobson's "Best"	15½c
" "Choice"	35c

Burden Boiler Rivets.

½, ⅝, 11-16 and ¾ inches diameter	3 30
Bridge ½, ⅝, 11-16 and ¾ inch diam	3 00

Wrought Pipe and Boiler Tubes.

Lap weld black, base	dis. 65
Butt " " "	dis. 55
Lap " galv. "	dis. 52½
Butt " " "	dis. 50
Boiler tubes 2¼" and smaller	dis. 65
Boiler tubes 2½" and larger	dis. 67½
Casing screw and socket joint	dis. 52½
Casing inserted joint	dis. 47½

MACHINERY SUPPLY MARKET.

Anvils.

American	℔ 9@10
Wright's	℔ 12

Bellows.

Blacksmiths'	Hill's	dis 40
	Bullock's	dis 50&10
Moulders'		dis 40@40&10
Hand		dis 40&10@50

Belting.

Boston Belting Co.'s standard	dis 70
" " " extra	dis 60&5
" " " best	dis 55
Cleveland Rubber Co. extra standard	dis 60&10
Hoyt's Short Lap	dis 45
Shultz Raw Hide Leather Belting, single	dis 40
Munson's Short Lap Single Leather	dis 50
Munson's Short Lap Double and Light Double Leather	dis 50&10
Shultz Raw Hide Leather Belting, Double and Light Double	dis 40
Standard, oak tanned	dis 50&10
Alexander Brothers' pure oak tanned	dis

Blowers and Exhausters.

B. F. Sturtevant's	dis 20
Boston Blower Co.,	dis 35
Buffalo	dis 40

Chucks.

Cushman's 4 Jaw Independent	dis 45
" Combination	dis 40
" Geared Scroll	dis 30
" 2 Jaw Brass Workers	dis 30
" Drill	dis 35
Wescott's Scroll Combination	dis 33⅓
" Independent	dis 40
" Little Giant Drill	dis
Horton's Universal	dis
" Independent	dis 45
Whiton's Independent	dis 45
National Combination	dis 40
Sweetland "	dis 40
Almond Drill	dis 20
Morse "	dis 15
Skinner's Combination Lathe	dis 40&10
" Independent Lathe	dis 40&10
" Universal Lathe	dis 40&10
" Drill	dis 20

Cutters and Reamers.

Cleveland	dis 10@15
Pratt & Whitney	dis 10@15
Standard	dis 10@15
Morse	dis 15
Brown & Sharpe, Milling Cutters	dis 15
" " Gear Cutters	dis 15

Crowbars.

Cast Steel	℔ 3½
Iron, steel points	℔ 1b 3

Drill and Drill Sockets.

Twist Drills	dis 50&10
Morse Taper and Straight Shank to 1½"	dis 50&10
Morse Taper and Straight Shank Larger than 1½"	dis 25
Drill Sockets	dis 25
Standard Twist Drills	dis 55@55&5
Cleveland " "	dis 55@55&5

Emery.

	No. 4 to 46 gr.	No. 54 to 150 gr.	Flour, C. F. F. FF.
Kegs, ℔	4½c	5 c	2½c
½ kegs ℔	4¾c	5¼c	2¾c
¼ kegs ℔	5 c	5½c	3 c
10 ℔ cans, 10 in case	6 c	6½c	5 c
10 ℔ cans less than 10	10 c	10 c	7½c

Emery Cloth and Paper.

Barder, Adamson & Co.	dis 50@50&5
H. H. Barton	dis 50@50&5

Emery Wheels.

Detroit	dis 60@70
Norton's	dis 60@70
Grant	dis 60@70
Sterling	dis 60@70
Celluloid	dis 10&33⅓
Northampton	dis 55
Crystal	dis 65@70
Vitrified	dis 60@70
Vulcanite	dis 60&10
Hamden	dis 60&10@70
Cyclone	dis 60@60&10

SHIFFLER BRIDGE COMPANY,

BUILDING DEPARTMENT.

SPECIALTIES: STEEL AND IRON BUILDINGS FOR ROLLING-MILLS, TIN PLATE PLANTS, STEEL WORKS, FOUNDRIES, FACTORIES, ROOF TRUSSES, GIRDERS, COLUMNS, BEAMS, CORRUGATED IRON, ETC.

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Branch Offices:
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65 Dexter Building, Chicago, Ill.
228 Lumber Exchange, Minneapolis, Minn.

FOR YOUR OUTING GO TO PICTURESQUE MACKINAC ISLAND.

ONE THOUSAND MILES OF LAKE RIDE AT SMALL EXPENSE.

Visit this Historical Island, which is the grandest summer resort on the Great Lakes. It only costs about $13 from Detroit; $15 from Toledo; $18 from Cleveland, for the round trip, including meals and berths. Avoid the heat and dust by traveling on the D. & C. floating palaces. The attractions of a trip to the Mackinac region are unsurpassed. The island itself is a grand romantic spot, its climate most invigorating. Two new steel passenger steamers have just been built for the upper lake route, costing $300,000 each. They are equipped with every modern convenience, annunciators, bath rooms, etc., illuminated throughout by electricity, and are guaranteed to be the grandest, largest and safest steamers on fresh water. These steamers favorably compare with the great ocean liners in construction and speed. Four trips per week between Toledo, Detroit, Alpena, Mackinac, St. Ignace, Petoskey, Chicago, "Soo," Marquette and Duluth. Daily between Cleveland and Detroit, and Cleveland and Put-in-Bay. The palatial equipment makes traveling on these steamers thoroughly enjoyable. Send for illustrated descriptive pamphlet. Address A. A. SCHANTZ, G. P. A., D. & C., Detroit, Mich

Cleveland Union Station.

Pennsylvania Lines.

Foot of Bank Street.

TICKET OFFICES at Station, Euclid Av., Woodland Av., and Weddell House corner.

THROUGH TRAINS RUN AS FOLLOWS BY CENTRAL TIME
* Daily. † Daily, except Sunday.

FROM CLEVELAND TO	LEAVE	ARRIVE
Pittsburgh and Bellaire	† 7:00 am	†12:10 pm
Salem and Pittsburg	* 8:00 am	* 8:30 pm
Pittsburgh, Bellaire and East	†12:45 pm	† 6:25 pm
Philadelphia and New York	* 1:40 pm	*11:25 am
Baltimore and Washington	* 1:40 pm	*11:25 am
Alliance and Pittsburgh	* 1:40 pm	*11:25 am
Ravenna and Alliance	† 3:25 pm	† 9:50 am
Hudson and Ravenna	* 5:00 pm	* 8:25 am
Philadelphia and New York	*11:10 pm	* 5:25 am
Baltimore and Washington	*11:10 pm	* 5:25 am
Alliance and Pittsburgh	*11:10 pm	* 5:25 am

Mt. Vernon and Pan-Handle Route

FROM CLEVELAND TO	LEAVE	ARRIVE
Xenia and Cincinnati	* 8:40 am	* 5:15 pm
Akron and Columbus	* 8:40 am	*5:15 pm
Akron, Columbus & Zanesville	†2:45 pm	†12:10 pm
Akron and Orrville	† 3:25 pm	† 9:50 am
Columbus and Cincinnati	* 8:00 pm	* 6:55 am

Valley Ry.

Depot foot of So. Water St.
City Office 137 Superior St.

	Arrive.	Depart.
Akron & Canton	*6:30 P M	*7:10 A M
Akron, Canton & Valley Jctn.	*10:10 A M	*3:15 P M
Valley Jctn. & Way Stations	†6:30 P M	†7:10 A M
Akron, Canton & Chicago	*8:00 A M	*6:30 P M
Wooster and Chicago	†2:45 P M	†11:00 A M
Wooster		†6:30 P M
Akron, Canton & Marietta	†2:45 P M	†11:00 A M
Steubenville, Wheeling, Washington, D. C., and Baltimore	†2:45 P M	†11:00 A M

†Daily except Sunday. *Daily. Pullman's Palace Vestibule Drawing Room cars between Cleveland and Chicago.

THE IRON TRADE REVIEW

make it a valuable adjunct to manufacturers of **machine tools, foundry supplies and power equipment.**

THE CONDIT-FULLER CO.,

Pig and Bar Iron,

CLEVELAND, . OHIO.

Oglebay, Norton & Co.,

LAKE SUPERIOR IRON ORES.

— AGENTS —

The Spanish-American Iron Co.,
Santiago, Cuba.

CLEVELAND. PHILADELPHIA.

E. C. POPE,

COMMISSION DEALER IN

Iron Ore, Pig Iron AND METALS.

Cleveland - Ohio.

ESTABLISHED 1854.

PETER GERLACH & CO.,

MAKERS OF

Saws, Tools and Machinery.

Office and Warerooms, 28 Columbus St.
Factories on Columbus, Winter and Leonard Sts.,

Cleveland, Ohio, U. S. A.

$2.50 CLEVELAND TO BUFFALO

Via "C. & B. LINE,"

Commencing with opening of navigation (about April 1st). Magnificent side-wheel steel steamers

"State of Ohio" and "State of New York."

DAILY TIME TABLE.

SUNDAY INCLUDED.

Lv. Cleveland, 6:00 P.M. | Lv. Buffalo, 6:30 P.M.
Ar. Buffalo, 7:30 A.M. | Ar. Cleveland, 7:30 A.M.

CENTRAL STANDARD TIME.

Take the "C. & B. Line" steamers and enjoy a refreshing night's rest when enroute to **Buffalo, Niagara Falls, Toronto, New York, Boston, Albany, 1,000 Islands,** or any Eastern or Canadian point.

Cheap Excursions Weekly to Niagara Falls.

Send 4 cents postage for tourist pamphlet.

W. F. HERMAN, Gen'l Pass. Agt. **T. F. NEWMAN,** Gen'l Manager.

Cleveland, O.

CHICAGO HEIGHTS

The Industrial Centre of Chicago

offers **Free Factory Sites** and other inducements.

If you are seeking a new location it will pay you well to investigate the merits of our proposition.

Chicago Heights Land Association

M. H. KILGALLEN, Gen'l Mgr. CHICAGO

Files.

Arcade	dis 60&10@60&10&10
Nicholson	dis 60&10@60&10&10
" X. F	dis 25
Kearney & Foot	dis 60&10@60&10&10
Black Diamond	dis 60&10@60&10&10
McClellan	dis 60&10@60&10&10
Disston's	dis 65@70
Western	dis 70
Stub's	dis 25
Grobet's	dis 30
Reynolds Bros.' Hand Cut	dis 50
Industry File Works Hand Cut	dis 50

Hammers.

P. S. W	dis 40
Atha new list, Jan. 15, 1887	dis 50
Heavy hammers and sledges under 5 lbs	12c
" " " " over 5 lbs	10c

Jack Screws.

Illinois Bolt Co. list	dis 75

Nuts and Washers.

Size of bolt inches	⅜	5-16	⅜	½	⅝	¾	1
Square	8	7	5½	4¼	4	3½	3¼
Hexagon	15¼	11½	8½	6	5¼	5¼	
Washers	9	8	7	5	4½	4½	4½

In lots less than 100 lbs, ₩ lb add ½c., 1 lb boxes add 1c to list.

Nails (wire).

List July 14, 1887	dis 85
Standard Penny Nails, ₩ keg card rate	
{ Car lots	$2.30
{ Less than car lots	$2.50

Oilers.

Zinc and Tin	dis 60
Brass and Copper	dis 50
Malleable (Hammer's), No. 1, $3.60; No. 2, $4.00; No. 3, $4.40 ₩ doz	dis 10@10&10

Picks.

Railroads, 5 to 6 lbs	$12 dis 60
" 6 to 7 lbs	$13 dis 6

Pulleys.

Iron Pulleys, Walker List	dis 50
Medart Pulleys	dis 50
Split Wood Pulleys	dis 5c@60

Pulley Blocks.

Moore's Anti-Friction Differential Chain Pulley Block	dis 20

Rivets.

Iron, Thousand, list November 1, 1894	dis 60@ 5
Iron, Ordinary, Cooper's Block and Carriage list November 1, 1894	dis 60@65
Copper	dis 50@50&10

Saws.

Disston's Circular	dis 40&20
" Band	dis 25
" Scroll	Net
Hack Saw Stubs	dis 20
" " Eureka	pis
" " Star	dis 20
Saw Swages Diston's	dis 30
Atkins' Circular Saws	dis 40 & 40
" Mill, Mulay and Drag Saws	dis 40&10
" Wood Saws	dis 40&10
" Silver Steel Diamond Cross-cut Saws	70c per ft
" Dexter Cross-cuts	50c "
" Diamond "	30c "
" Tuttle Tooth Cross-cuts	25c "
" One-man Cross-cuts	32c "
No. 1 Handles	23c per pair
No. 6 "	16c "
Excelsior Saw Tools	$6 per doz
Derfection "	$15 "
Petroit Saw Works, Circular	dis 50
" " " Band	dis 25
" " " Mulay	dis 45

Taps.

Cards, Hand and Nut to 2 in	dis 50
Carpenters' " " "	dis 50
Morse " " "	dis 50
Pratt & Whitney " " new list	dis 10
Machine Screw Taps	dis 55
Pipe Taps to 2½ in	dis 70
Stay Bolt Taps	dis 25
Stove Bolt Taps	dis 55
Pulley Taps	dis 40

Vises.

Solid Box	dis 60
Parker's	dis 20@25
Prentiss	dis 20
Stephen's	dis 25@30
Barrett's	dis 30
Miller's Falls	dis 40
Merrill's	dis 15@20
Howard	dis 30

Wire.

New List, Apr. 9, 1894

Brass	dis 40
Copper	dis 40
Bright and annealed, Nos. 0@18	dis 70&10@75
" " Nos. 19@26	dis 75@75& 5
" " Nos. 27@36	dis 75&10& 5
Coppered Nos. 0 to 18, market list	dis 70@70& 5
Galvanized Nos. 0 to 18 " "	dis65&
Tinned market Nos. 0 to 18	dis 67½
Cast steel	dis 50
Tinned Broom Wire	dis 70&5@70&10
Annealed Fence, Nos. 8 and 9	dis 75
Annealed Grape, Nos. 10 to 14	dis 75
Stub's Steel Wire regular	.95c ₩ lb dis 30

Wrenches.

Coe's genuine	dis 50
Girard Standard	dis 70&10
Agricultural	dis 75&10
Mechanic's	dis 55&10& 5
Bemis & Call's Combination	dis 35
Donohue's Engineers	dis 20&10
Lamson & Sessions Engineers	dis 60
Billings & Spencer's Drop Forged	dis 25
William's " "	dis 25
Alligator " "	dis 40

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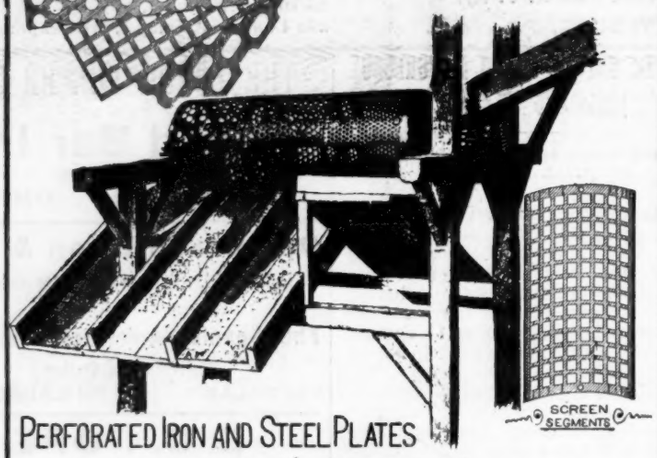

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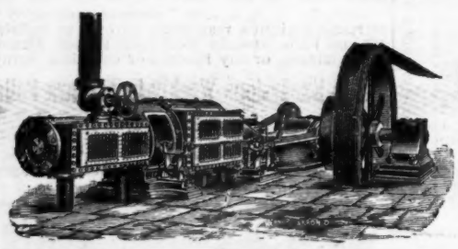

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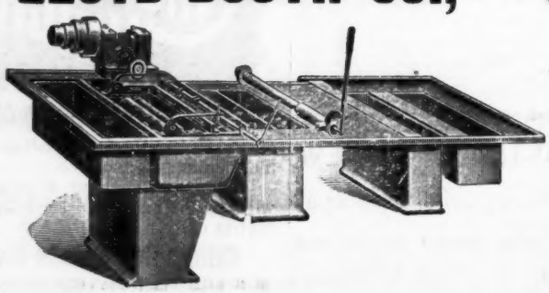

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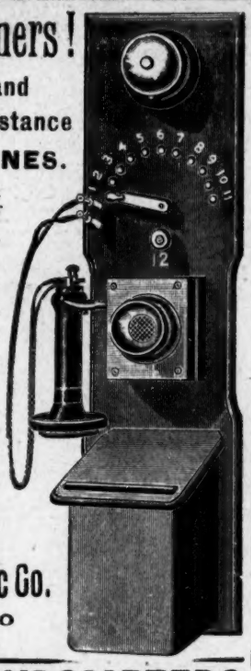

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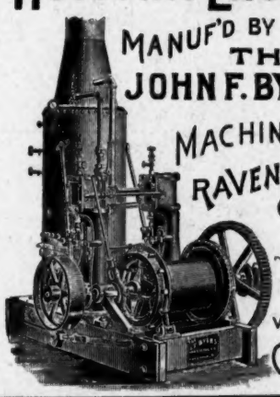

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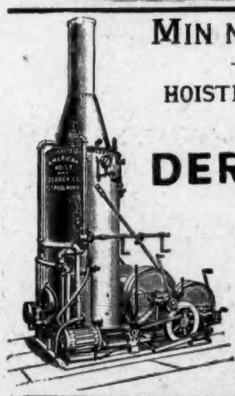

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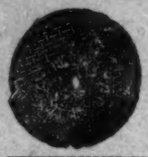

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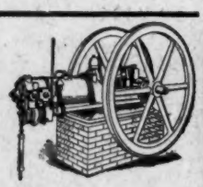

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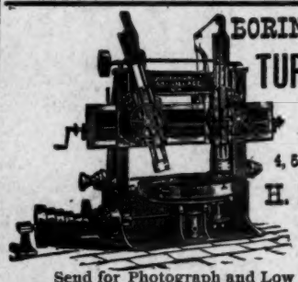

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